Products finishing

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Products Finishing

CINCINNATI, OHIO VOL. 3, NO. 6

MARCH, 1939

Modern Production Finishing Methods

An outline of the procedure used by an Eastern shop in handling the finishing of miscellaneous contract work in quantity lots.

By FRANK W. CURTIS

ENGINEERING technique plays a rather important role in connection with finish painting at the plant of the H. S. Products Finishing Corp., Brooklyn, N. Y. It is not so much a case of merely coating the surface as it is an analysis of the product itself, the material from which it is made, the service it has to render and, quite naturally, an attractive appearance to enhance sales appeal, all of which determine the procedure to be carried out.

Acting as a contract plant for more than 20 years, and having finished a wide variety of parts for many manufacturing organizations, has enabled

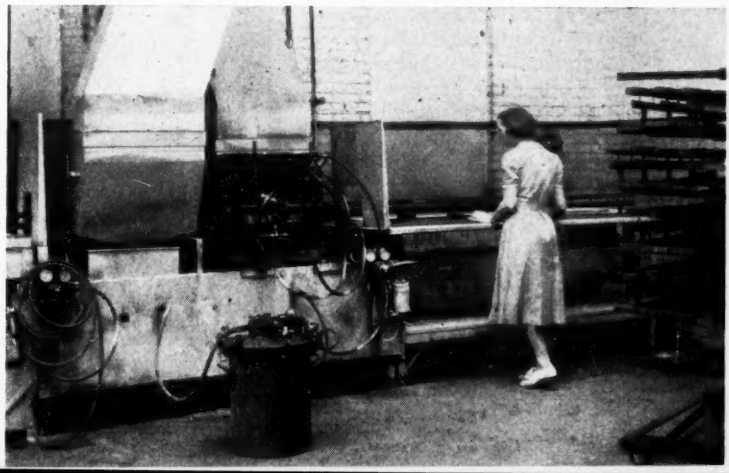


Fig. 1 — Small parts are finished automatically with the equipment shown in this illustration.

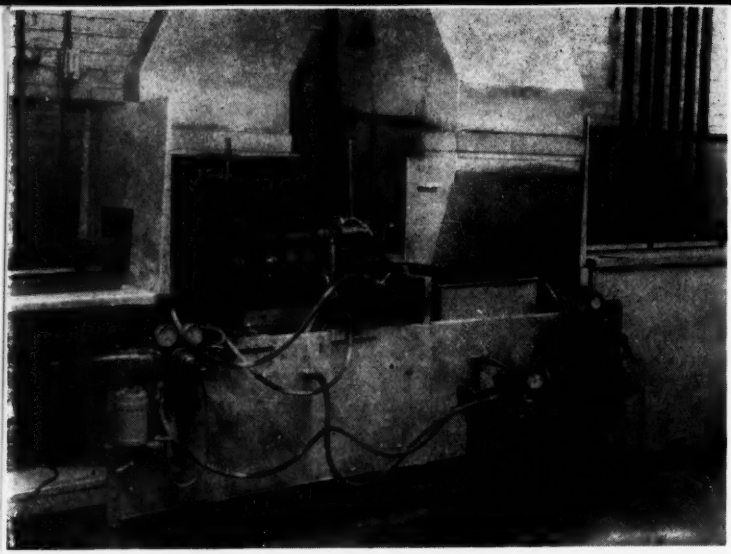


Fig. 2—The parts to be finished pass through a spray booth in which adjustable paint spraying nozzles are located.

the compilation of much valuable knowledge that has resulted in a specialized handling service to suit a given type of product.

Many of the smaller parts, handled in quantities, are sprayed automatically, as shown in Fig. 1. For this class of work a unique procedure is used. Work-holding fixtures are made to suit the part to be finished, several fixtures are mounted on a rack, and the rack in turn is placed on a conveyor, which carries the work past several spray guns that are automatically turned on and off as the work enters and leaves the spraying zone. At the end of the conveyor, the rack is removed, then placed on an adjacent conveyor that feeds the work through the bake oven. Hence the part is finished with a minimum of handling and at a very high rate of output.

The central portion of the automatic unit includes the spray guns and holders, and two hoods, positioned opposite each other. One hood is arranged to draw off the fumes from the guns used on one side and the other from those on the opposite side. In all, six spray guns are included in the unit, in which all or any portion can be used, depending upon the shape and the nature of the work going through. Each gun has an individual adjustment so that it can be positioned as needed.

In Fig. 2 may be seen a view of the spraying section and the left-hand end of the conveyor where the work-holding racks are removed. The conveyor is driven by a variable-speed transmission drive so that the rate of feed can be varied from 10 to

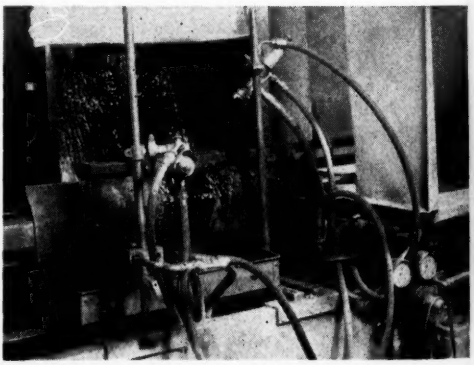


Fig. 3—Close-up view of the arrangement of the spray guns which are used for finishing die cast camera badies.

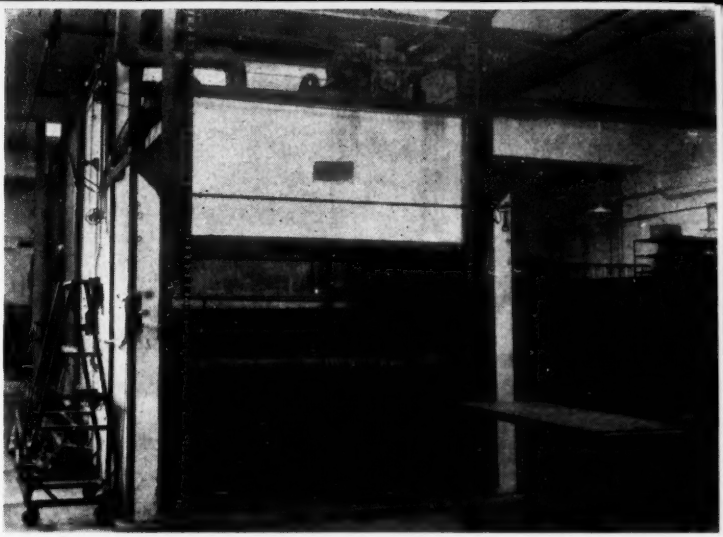


Fig. 4 — Synthetic wrinkle black enamel which is used for finishing camera bodies requires baking for one hour at 275 deg. in a oven of this type.

40 feet per minute as may be required. The tracks on which the work-holding racks slide can be adjusted to different widths to suit various sizes of racks. This feature also enables the use of individual trays when wide parts are encountered. In Fig. 3 is illustrated a close-up view of the arrangement of the spray guns for finishing die-cast camera bodies. The parts may be seen passing the spraying zone for the finishing of one side and top surface. Then as the work moves along, it passes the spray guns for finishing of the opposite side.

In handling parts of this size, a production of 24,000 pieces daily can be obtained. On smaller parts, such as watch cases, the output runs as high as 8,000 pieces hourly. Quite naturally, the operation and control of the spraying unit is of importance because any oversight or incorrect adjustment might result in a large quantity of rejections. On this account, each part is thoroughly analyzed first, then necessary tests are made to insure that all timing and spray adjustments are correct, after which the production run is started.

Automatic spraying of this type is used largely for wrinkle finishes. In order to get the utmost in perfection and uniformity from this type of painting, it is necessary to eliminate as much human element as possible. This is quite obvious because an excessive amount of paint results in runs or sags, whereas an insufficient amount will not produce a uniform wrinkled surface.

Synthetic wrinkle black

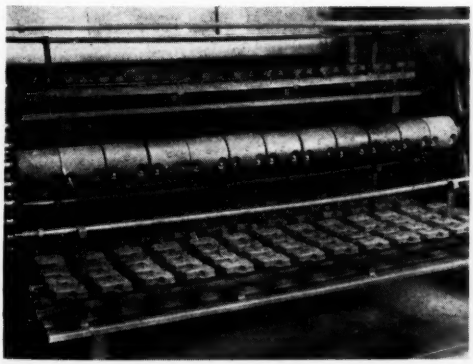
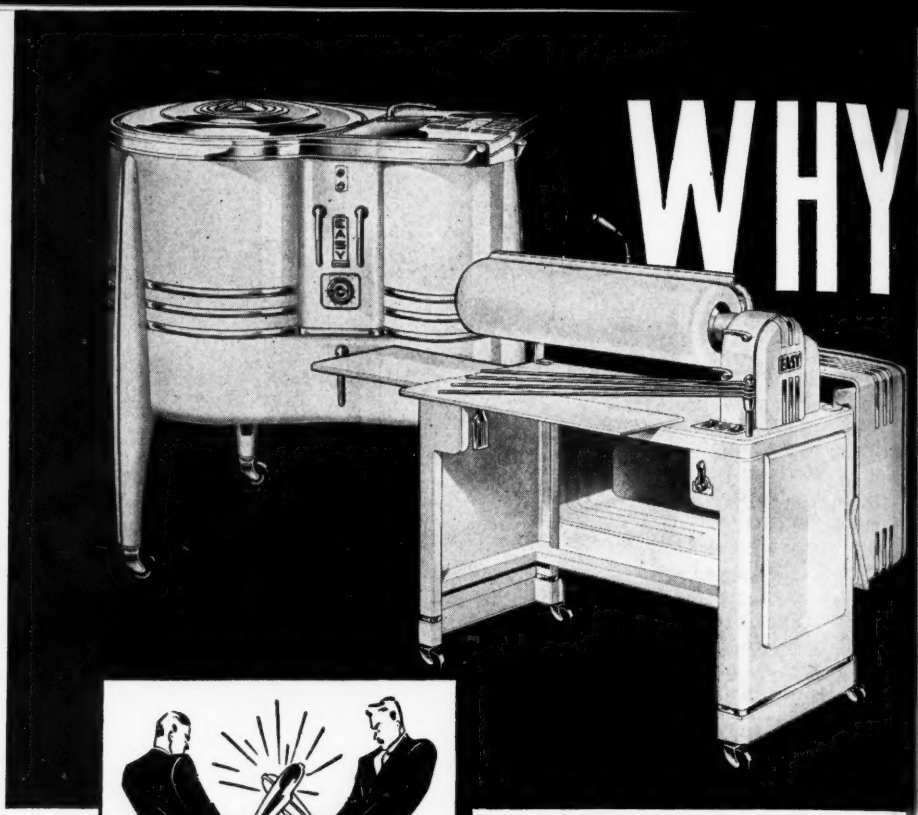
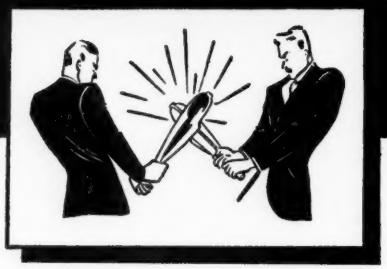


Fig. 5—The work holding racks are located on the crossbars of the conveyor chain as shown in this illustration.





(Above) Easy Washer Model 9SS9, Easy Ironer Model 139. Both incorporate distinctive features which have made Easy a well respected name in its field.

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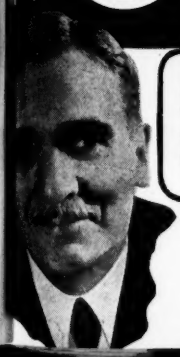

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Fig. 6—In handling parts in large quantities, it is necessary to provide adequate work handling equipment such as shown herewith.

enamel used for the finish of the camera bodies, requires baking for one hour at 275 deg. F. This is done in a Gehnrich oven as shown in Fig. 4, which is equipped with an automatic conveyor. The length of the oven is 52 feet, and the height is 12 feet. Approximately 16,000 pieces can be accommodated in the oven at one time.

A close-up view showing how the work-holding racks are mounted on the oven conveyor is shown in Fig. 5. The loading end of the oven is located between two automatic painting units. The timing of the conveyors for spraying and the rate at which the oven operates, are synchronized so that an equal number of racks are handled hourly in each. Usually, one spray unit is used for painting the outside of a part and the other unit for the inside. The oven conveyor is driven by a variable-speed drive to enable parts to be passed through in

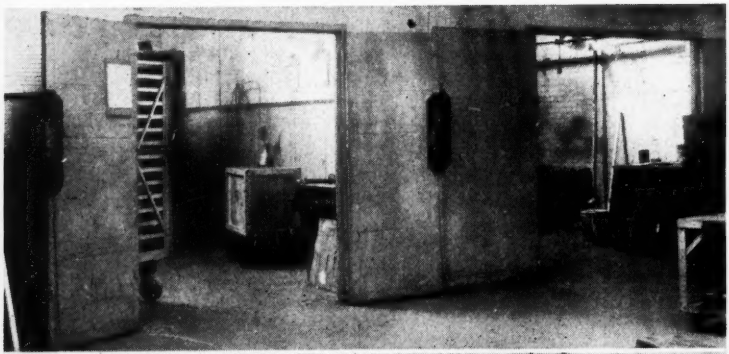

Fig. 7 (Above)—For spraying of large parts that cannot be handled automatically in this plant, routing is made through spray booths which are located in the enclosed rooms shown here.

Fig. 8 (Below)—The interior of one of the rooms shown above illustrating two individual spray booths.

from three-quarters to two hours, and at varying temperatures from 200 deg. to 350 deg. F.

In handling parts in large quantities, it is necessary to provide adequate materials-handling equipment and in Fig. 6 may be seen one of the portable trucks used for this purpose. Each truck holds a large quantity of racks as shown and is used to convey parts to the spraying units, as well as from the outlet end of the oven to the shipping rooms.

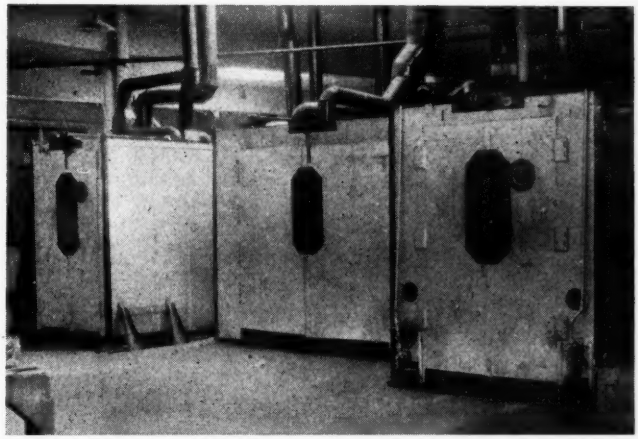

Fig. 9—A view showing three of the eight ovens in which small lots of work are baked following spray finishing.

Many types of finishes are carried on in this plant, including Japanning, automatic dipping, lacquering of various kinds, plating, graining, imitation of woods, marble and leathers, silk screening for decorative purpose, cob-webbing and many others. In order to correctly apply such a variety of finishes, it is important to have the proper control of viscosity and gravity of paints, in order to obtain results commensurate with weather conditions and temperature. This is important in order to insure proper adhesion, durability and a perfect bond. Likewise, much thought is given to the type of finish suited for wear and tear to which products will be subjected. For example, parts of a similar kind which might be subjected to different atmospheric conditions will require different types of pant. Parts for a vending machine, for example, used in sea air must be finished differently from one used in the Middle West.

Another problem encountered in a shop of this kind is that of matching paints put through at different times. Quantity lots might run through at intervals of from one month to one year, and the match with preceding runs must be identical. It is in this respect where painting, handled from a scientific and engineering standpoint, can be properly duplicated.

Then, too, a knowledge of the quality of paints is essential because very often results depend on the treatment. For example, it was found that on certain grades of white paint that a far more durable finish can be produced by baking for 5 minutes at 300 deg. F. than was previously obtained in two hours of baking at 225 deg. F. A change of this kind materially reduces costs and permits the handling of a large quantity of parts in a given time. The same is somewhat true with automatic dipping. The withdrawing speed is very important and is dependent entirely upon the shape and size of the part.

If the work is withdrawn too slow the paint is likely to run. On the other hand, if it is withdrawn too fast it may leave objectionable drops on the edges.

For the spraying of large parts that cannot be handled automatically, routing is made through spray booths which are located in enclosed rooms such as those shown in Fig. 7. Each room is provided with doors which may be closed to prevent the formation of dust on finished surfaces.

The interior of one of those rooms, showing two booths, is shown in Fig. 8. This arrangement is primarily for medium sized parts, whereas, in other spray rooms single booths of larger size are used. By closing these rooms off from the balance of the shop, it is possible to avoid dust particles from collecting on the surface of parts being sprayed, thus insuring a better finish.

On work put through in small lots, the baking is done in ovens such as shown in Fig. 9, of which a total of eight are available. These are located conveniently near the various spraying booths and automatic dipping equipment.

On real small parts, such as die casting, screws, forgings and miscellaneous machined parts, painting is done centrifugally in the machine shown at the left in Fig. 10. The parts are placed in a wire mesh basket which, in turn, is inserted on tracks attached to a motor driven spindle, then a tank containing the paint located within the machine is elevated by means of a lever so that the entire basket of parts is immersed. The tank is then lowered and the motor started so that the basket revolves at high speed for approximately 15 seconds. This whirling action removes excess paint which drops back into the tank.

On certain shaped parts the work is also revolved in an opposite direction in order to remove excess paint that might be baked. After whirling, the work is removed, placed on a mesh tray, then placed in an oven and baked for one hour at 250 deg. to 350 deg., depending upon the nature of the part.

As is common with most plants, a good paint job depends almost entirely upon proper cleaning. In fact, good cleaning is considered two-thirds of successful finishing. For the majority of parts, a degreasing process, using trichlorethylene, is applied. This method removes oil, dirt, and foreign matter from all types of met-

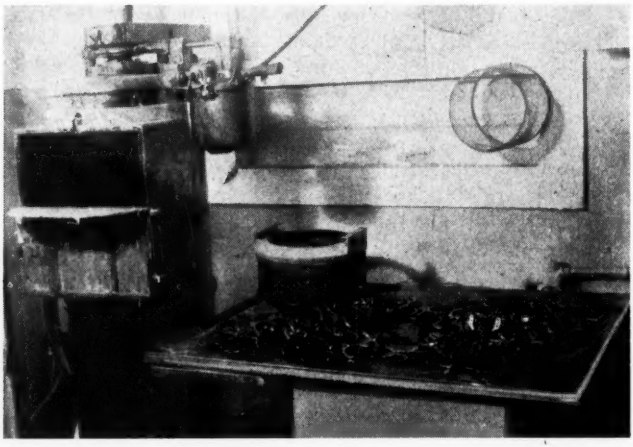

Fig. 10 — On the smallest type of work processed in this plant, the finish is applied by means of the centrifugal machine shown here.

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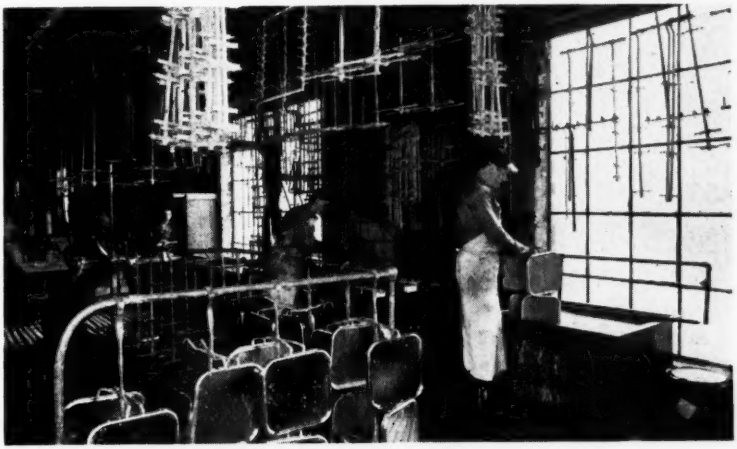
—STEEL MATERIALS CORPORATION, DETROIT



A view of the Steel Materials Corporation plating department showing racks insulated with Miccro Supreme Stop-Off Lacquers

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• The Steel Materials Corporation, Detroit, Michigan, are manufacturers of a wide variety of stamped kitchen utensils and automotive parts. This concern operates a very complete and up-to-the-minute plating department. In order to maintain the highest possible production efficiency in this department, new materials and new methods are always given consideration. When Miccro Supreme Stop-Off Lacquers were introduced, they were given a thorough trial. The results were such that these lacquers have now replaced every other method previously used to provide protective coatings for the plating racks used by this company.

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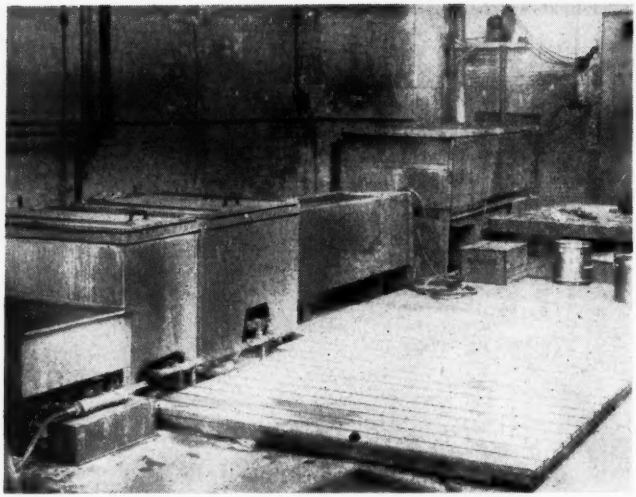

Fig. 11—All cleaning and stripping processes are done in the room shown above.

als, particularly die castings, as well as semi-assembled products. This operation, as well as stripping and other cleaning processes, are carried out in separate rooms, as shown in Fig. 11. One of the reasons for isolating this department from the balance of the shop is in view of the harmful effects of fumes, which very often have a tendency to produce rainbow marks on finished surfaces.

In handling die castings requiring surfacer finishes, a Bonderizing operation is applied prior to painting. This process changes the surface of the metal to offer a proper bond by cutting down the slick finish which very often causes failure.

The work is immersed in the Bonderizing solution for one to three minutes, depending on size. The procedure in handling such parts is to (1) Bonderize; (2) rinse; and (3) chromic-acid dip, the latter having a neutralizing effect on the surface, by opening the pores and causing crystallization.

One of the important requirements of finishing products is to apply a finish which is not only modern but which harmonizes with the product itself. One type of finish may have sales appeal this year but may not next year. For this reason, it is necessary to keep abreast of modern finishing trends, so that when a change becomes necessary, the modification may be made quickly. In this respect, one of the advantages of contract work is that equipment does not necessarily become obsolete because of a change in the finish of some products. There are always other parts coming along that may require the former type of finish so that it is not so much a case of replacement, which might confront plants handling individual products, as it is revamping and revising of processes to meet the changing trends.

Just as a shop manager likes to look over the design of a new product to see if it can be made economically, so is the policy carried out here to see if the part to be finished lends itself to economical painting.

There are times when some minor changes can be made or procedures revised that will lower costs. For example, in connection with automatic painting it is necessary to "tool up" for production, that is, to make masks, holding devices, and other attachments, all of which are determined by the shape of the product itself. If, in the design of a prod-

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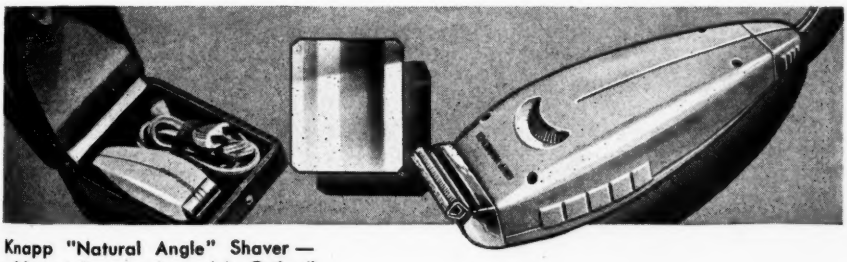

Knapp "Natural Angle" Shaver — with metal parts cleaned in Orthosil

PENNSYLVANIA SALT MANUFACTURING COMPANY
Chemicals

uct, no thought to painting is made, so that projections or ears on the part cover or hide certain surfaces, forming pockets, so to speak, it might become necessary to add a separate painting operation to finish the so-called hidden portion. On the other hand, by analyzing the design in the early stages, before production is started, it may be possible to recommend a change that will simplify handling as far as painting is concerned and thus reduce costs. Designers are not always on the lookout for such technicalities, yet the thought is one that can be carried out advantageously on all kinds of products.

Abrasive Grain Data Sheet No. 1. "Borolon," an aluminum oxide abrasive grain for polishing and general industrial uses, is described in the four pages of "Abrasive Grain Data Sheet No. 1," which is now being issued by Abrasive Company, Philadelphia, Pa. Borolon is a fused, crystalline aluminum oxide abrasive produced in the arc type electric furnace from a mixture of calcined or dehydrated Bauxite, ground petroleum coke and iron borings or filings. A large part of the plant facilities of Abrasive Company is devoted to abrasive grain production in addition to the manufacture of grinding wheels. Special processes and equipment are used to produce abrasive grain especially adapted to polishing and general industrial uses.

The production of Borolon, grain sizing, inspection and packing are described in Data Sheet No. 1. The various types of Borolon polishing grain, including CT Borolon, B Borolon, T Borolon and TB Borolon, are illustrated and described. A complete data sheet for setting up polishing wheels is also included.

A copy of "Abrasive Grain Data Sheet No. 1" can be obtained by writing Abrasive Company, Philadelphia, Pa.

"A Good Start to a Better Finish" is the title of a 4-page folder illustrating and describing the application of Monel metal pickling equipment. This folder is being issued by The International Nickel Company, Inc., 73 Wall St., New York, N. Y. The processes in which Monel metal equipment is recommended and which are included in the folder are plating, enameling, tinning, and galvanizing.

Copy of "A Good Start to a Better Finish" will be sent free upon request.

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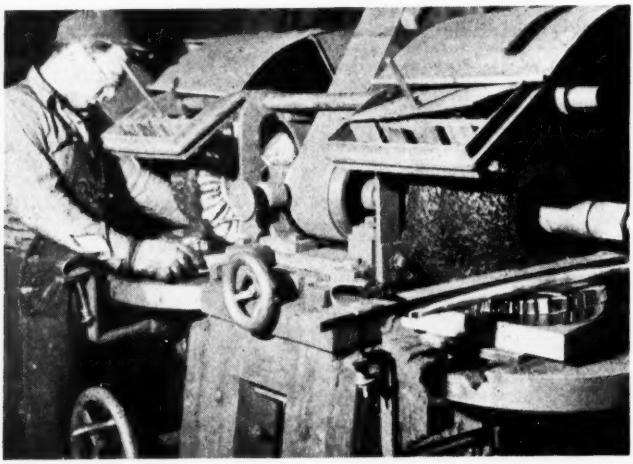

A number of requests have been received for the name of the buffs shown in the illustration Fig. 2 of the article, "Interesting Methods Used in Silverware Manufacture," which was published in the January, 1939, issue of PRODUCTS FINISHING. These buffs are Airway Ventilated Buffs, made by Jackson Buff Corporation, 20 - 03 41st Ave., Long Island City, N. Y. The illustration is reproduced here.

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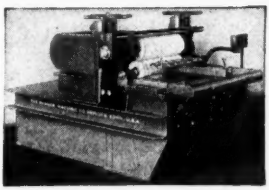
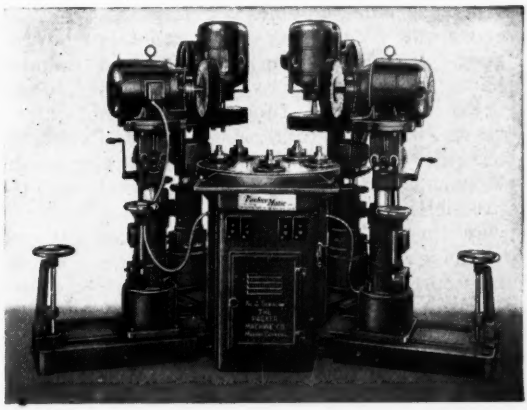


Double Row PACKER-MATIC For Finishing both sides of Flat Work

Straight Line Conveyor

No. 4 Rotary Type — 5 Work Stations



Inspection and Maintenance of Plating Equipment

By L. L. STOFFEL
Research Engineer, The Ohio Carbon Company, Lakewood, Ohio

PROPER and systematic inspection and maintenance will save money and annoyance, because it enables the plating department operator instead of the generator to decide when the generator is to shut down for repairs. The same holds true of other electrical equipment in the shop.

Tank Maintenance

Rods, anode hooks and connecting clamps should be inspected and cleaned frequently. Corrosion by acid fumes or tank liquid is apt to produce a coating of oxide which is practically a non-conductor of low-voltage current. At the best, it may merely make the plating process slow and uncertain, and needlessly increase the power bill. At the worst, it may cause spoilage of work and other serious troubles; partly because the rods where the contact is good will "hog" the current, and partly because the oxide is apt to break down from time to time on various rods and thus cause wide and irregular changes of plating current. Modern plating solutions and mass production methods leave little leeway for uncertain current densities.

The cable clamps on the rods are particularly liable to get corroded. They may appear all right, but since the rods are not always of the same kind of metal as the clamps, the presence of acid is apt to set up electrolytic action at the contact surfaces which may greatly increase the resistance of the circuit at those points. Sludge accumulation in the tanks should also be checked carefully; for apart from the risk of dirty deposits such sludge is likely to act as a by-pass for the current. Leaky tanks are a pest; and one often unsuspected cause, especially in the old style wooden and lead lined ones, is a sunken foundation which causes severe strains to be set up by the weight of the solution. If the tank lining is strong and flexible enough, nothing much may happen, but it is well to check up on this matter from time to time, especially if the tank has been newly installed.

Hoods

Where the factory regulations prescribe exhaust hoods—and that is on almost every tank—the velocity and volume of the air should be periodically tested. The older the system the more such tests are needed, for an air-leak in the ducts at some point in the installation may practically short-circuit the suction on some of the hoods, or may lower the velocity below what is necessary. No elaborate testing instruments are needed — in fact, you can make an exceedingly accurate and reliable "draft gage" out of a piece of glass tubing and some rubber hose.

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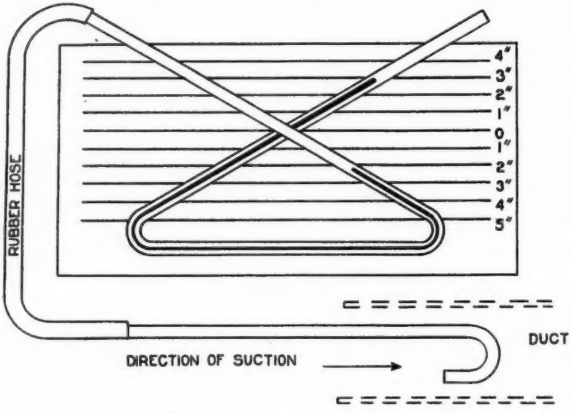
The form of draft gage shown in Fig. 1 is an unusual one, but it has the advantage that its readings are not affected by its not being held horizontal more than approximately, and that it gives a large displacement reading of the liquid for comparatively little suction.

After bending the tube in the form of an X as shown, mount it on a board with the horizontal base of the tube parallel to the bottom of the board. On the board, rule pencil lines parallel to the tube base at intervals of ⅛ in. apart. Make a hooked tube as shown. Attach a rubber hose to either end of the instrument tube and hold the other end of the hose in the duct so that the open end of the hooked tube faces toward the direction of the movement of the air. The velocity of the moving air will create pressure in the instrument tube which will cause the level of the liquid in one arm to rise and the other to fall. If the liquid is filled up to the intersection of the two arms of the X when no pressure is exerted by the hose, the vertical distance of the displacements of both arms indicates the force of the air acting in the duct. The instrument illustrated shows a differential of 3 in. plus 2 in., or 5 in. If it were truly horizontal it would read 2½ in. plus 2½—but there would be no error in the total differential. Water is the most convenient liquid, and it is known that 4,000 feet per minute velocity will cause a total displacement of 1 in. in water level, as read on the pencil lines of the board. To find velocities for other readings, remember that they will equal 4,000 x (square root of vertical height of displacement). Thus a 1 in. drop on one side and a 1 in. rise on the other (2 in. vertical displacement), equals 4,000 x 1.412—that is, 5,660 ft. per minute. Knowing the area of the duct, the number of cubic feet per minute may be easily worked out if desired.



(Courtesy The Ohio Carbon Co., Lakewood, Ohio.)

Fig. 1—"Home-Made" but accurate draft gage for measuring suction and air volume at exhaust hoods and in ducts. Unlike most draft gages, this one does not need to be leveled accurately when taking a reading.

Switchboards on Tanks

Each switchboard should be inspected at least once a month — more often if it is exposed to corrosive fumes. Contacts should be kept clean and bright by the use of fine sandpaper; otherwise there will be loss of power at these points. Even "self-wiping" contacts are none the worse for a clean-up now and then. Those switch parts which do not have to make contact can advantageously be rubbed over with a thin coating of vaseline, the coat being removed with a wiper when it shows signs of being

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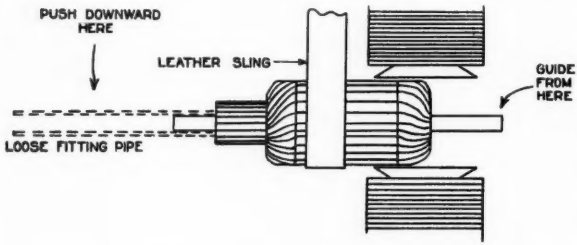
attacked by the acid. This particularly applies to the toggle springs, if such are present. The rheostat resistance strips or coils should be checked for possible corrosion or working loose or sagging. These, of course, cannot be properly protected by vaseline, since they get hot. The field rheostat of the generator should also be looked after. It seldom needs anything but cleaning, however, for its coils are generally imbedded in acid-resisting material — or should be.



(Courtesy The Ohio Carbon Co., Lakewood, Ohio.)

Fig. 2—Easy and safe way of taking an armature in or out of its housing without risk of damaging core or windings.

Instruments

Instruments are not always installed, but it is very desirable to have every switchboard equipped with them. Preferably, there should be one ammeter to each tank circuit, and a voltmeter and ammeter in the main circuit of the generator. Accurate measurements are important in mass-production methods. Moreover, proper instrument equipment is a great help in locating troubles. All such instruments should be well-protected against any fumes they may be exposed to.

I remember an instance of the need of instruments in diagnosing trouble in a case where the generator ran very hot, so hot in fact that its brushes wore down about five times faster than they normally should have. Each tank was equipped with its own ammeter, however there was no main ammeter or voltmeter. Nevertheless, the total current requirement of the various tank loads did not exceed the current which the generator should have been able to handle under ordinary conditions.

A temporary ammeter was installed in the generator line, and the mystery was solved. There was an overload of about 50 per cent and investigations showed a ground on the generator and another one through some acid soaked wooden main cable racks. The extra 50 per cent of current was simply passing through the solution soaked into the floor from one ground to the other, so that the power was being largely used to plate the building.

Another use for instruments is for detecting poor conducting conditions during a run. If, for example, the proper current will not flow at the usual voltage — especially if two or three of the tanks are not getting their right share of amperes, bad contacts on those circuits are probable.

Generator Inspection

If actual troubles have developed since the last inspection, these must, of course, be cleared up first. It should be remembered, however, that curing one obvious trouble does not justify slurring over any part of the regular inspection routine. The trouble which has been cured may have started others which are so far unsuspected, and they will not get any

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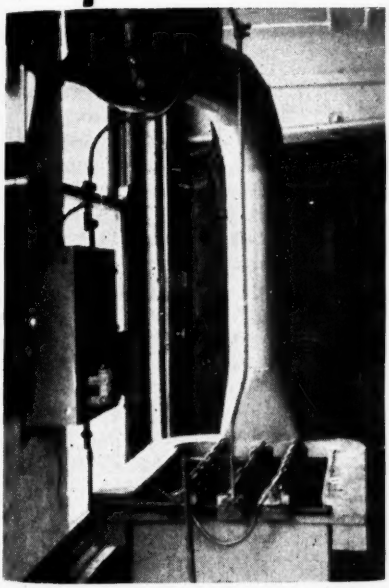

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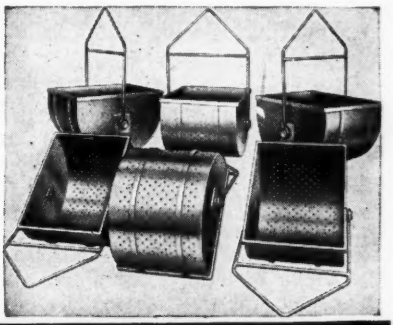

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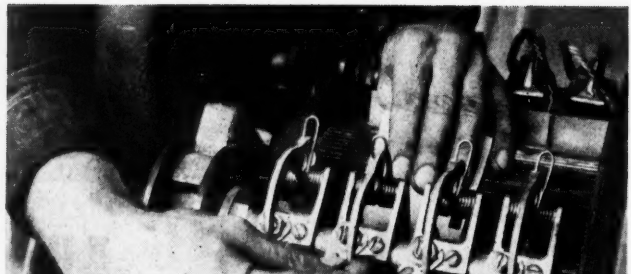

(Photo Courtesy The Reliance Electric & Engineering Co., Cleveland, O.)

Fig. 3 — Method of "Bedding-in" a brush with sandpaper.

better as time goes on.

Brush System

While it is not always possible to entirely eliminate every least trace of sparking, it should never be more than occasional and barely perceptible. Many modern generators are absolutely sparkless for all loads within their rated capacity. Actual destructive sparking, however, must be eliminated — and it can be. First, feel each brush to see that it is running cool. None should be unpleasantly hot to the back of one's hand. Next, lift each brush and examine its running surface to see that a proper "all-over" contact is being made. Badly bedded brushes may both spark and heat. Then see that the pressure of the brush springs is equal and sufficient, but not too heavy. The brush manufacturer will gladly send you the correct figure for this.

Make sure that the pigtail connections are tight at both ends; sometimes, though rarely, a pigtail will work loose in the brush, thus introducing needless resistance and upsetting the proper equality of current distribution between one brush and another. See that the brush studs and their cables make good connection and that the studs are not loose on the rocker. Satisfy yourself that the rocker is set at the correct sparkless position and that it is clamped firmly in position so that it cannot shift around. Examine the commutator for wear, burning, pitting, "high mica," skewed or loose bars, and so on. Smooth it off with fine sandpaper — never use emery cloth — if it needs cleaning from dirt or glaze, because either condition tends to cause sparking and sluggish excitation. If the commutator is bad, it may prevent the machine from exciting at all. Where grooving has been allowed to occur, it may even be necessary to reface the surface with a commutator stone, or to remove the armature for re-turning on a lathe.

Armature

Check up on the tightness of the wire bands which hold the coils in their slots against centrifugal force. Sometimes, the end of a banding wire may become unsoldered, particularly if the machine has been running ex-

cessively hot. When this happens, it is only a question of time before several yards of wire come adrift while the machine is running and a nasty, and occasionally dangerous, mess results. Is the armature clean, and the coils free from corrosion? Acid fumes and splashes play havoc with copper and insulation. Today, however, most machines are well-protected by a coating of acid-resisting paint. They should be re-painted with such material as often as needed.

Here is a tip on removing an armature from its housing if removal is necessary. In most cases, the housing entirely surrounds the circumference. An armature, being composed of soft iron laminated sheets and of delicate coils of wire imbedded in the core slots, cannot be handled at all in a rough manner. Yet, it is impracticable to lift it out with a sling because the housing gets in the way. Figure 2 illustrates a manner in which an armature can be removed without injuring any part of it. On the commutator end of the shaft, a loosely fitting piece of pipe is placed. The armature is then slung in a wide strip of leather belting so that it tends to overbalance towards the far end; that is, the sling is about as near the commutator end as it can be, and still supports the armature entirely from the core itself. Have one or two men bear down on the pipe, and then start the hoist. It is now an easy matter to guide the armature out of or into the housing by means of the leverage on the pipe, yet the sling is far enough off-center so that the core may rest entirely on the lower pole faces and yet permit the sling to be easily removed.

Field System

Check for loose or corroded connections between field coils and between coils and rocker cables.

Bearings

If ball bearings are used, they should be inspected every three or four months and cleaned out and repacked with suitable grease at least once a year. It should be needless to state that new grease should be strictly clean, but it isn't always. It should, of course, be kept in stock in tightly closed cans. It should be good grease, of the kind recommended by the generator maker or by one experienced in lubrication engineering. It does not pay to save a few cents once a year and have trouble with hardening, leakage, and so on. Never pack a bearing more than about half-full, otherwise the resulting friction of the lubrication will cause the bearing to everheat.

If sleeve bearings are used, the oil wells should be drained, washed out thoroughly with kerosene, all traces of grit and kerosene removed, and refilled with clean oil. Once a month is generally enough in most cases. Never "over-lubricate." Fill to the correct gage level, or to the vent-hole. You can't get more oil in a bearing than it will hold and any surplus will drain into the end-covers and the housing, and will ultimately destroy the insulation and get all over the commutator and brushes.

Sometimes, owing to a crack or a porous casting, a bearing will develop a seeping leak which will show up as oil or stains on the outer surface. This can generally be stopped with a heavy coating of some type of oil-proof cement or "filler." The oil rings also need inspection. If they do not revolve freely on the shaft at all times during the run, the bearing will overheat for lack of oil, even though the well may be sufficiently filled. The main causes of stuck rings are as follows:

(1) Rings bent "out-of-round" or sidewise. This is most likely to be due to carelessness in re-assembling the machine after a repair.

(2) Oil too thick. (Most likely to occur in winter.)

(3) In cases where the rings are made in two halves screwed together (for convenience in assembling without removing the bearing bushings), the screws may have worked out so that the rings fall apart.

(4) Jumping of rings out of their running grooves, due to the ring retainer clips having shifted or fallen off into the well.

(5) Irregular revolution of rings due to worn bearings or excessive vibration from other causes.

"Oil-throwing" is generally due to a defect in the bearing design, and is seldom found in modern machines. Little can be done about it except installing felt or leather washers attached on the faces of the bearings and fitting closely to the shaft.

Alignment and Leveling

Make sure that the drive is in proper alignment. A misaligned belt drive shows up by the belt refusing to stay central on the pulleys. It may be due to an improperly scarfed or jointed belt or to the foundation bolts working loose. In the case of a wooden foundation, the natural shrinkage of the wood under compression may permit shifting of the base, particularly if the generator is newly installed. Acid spray may cause rotting and consequent distortion of the drive centers. An excessively loose belt may need adjusting, but the looser the belt the better so long as it transmits the power all right. Of course, no amount of tightening will correct misalignment, for a belt will, when properly aligned, run evenly although it may be far from tight.

A concrete foundation seldom gets out of line, but is much harder to correct when it does. Cracking of the concrete due to freezing while setting, or to unsuitable mixture, is one principal cause. Another is a foundation which is not sufficiently wide and deep to withstand the belt pull. Generally, either fault means a "major operation" for permanent cure. Alignment should be very carefully watched on direct coupled motor-generator sets. Since there is no sidewise pull there is little likelihood of trouble, but on the other hand, a thousandth of an inch error in a direct-coupled set may be much more serious than an eighth of an inch misalignment on a belt drive, because the two machines are often rigidly connected.

The leveling should be also checked from time to time. If the generator shaft is not truly horizontal, there will be a tendency for it to run against the bearing at one end, and since such bearings are seldom designed to withstand thrusts of this kind, overheating of the bearing is likely to take place. If, however, the deflection from the horizontal is comparatively small, the armature is liable to drift back and forth under the combined effect of the tilt and the field pull. In this case "slamming" and noise may occur. (A further possible cause of overheating and noise is an armature which is not properly centered with the poles, but this is not likely unless an inaccurate bushing job has been installed at some time or other.)

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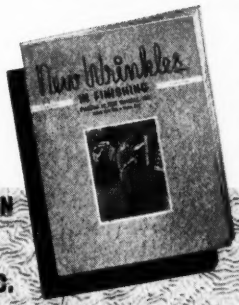

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chinery dirt is by far the worst. Even overloading is seldom as deadly in its effects. This is particularly true of plating generators. Their low voltage and high currents render them unusually sensitive to any foreign matter in the working parts, and in the electrical circuits. Then, too, they are too often exposed to finely-divided floating acid spray and fumes — sometimes even to direct "slopping" from the tanks when these are unloaded.

Furthermore, instead of the plain dust generally met with in a motor, which can be easily blown off with bellows or compressed air, one is more likely to be faced with a hard paste of dirt which is so closely adherent to the exposed surfaces that nothing short of a solvent such as gasoline or carbon tetrachloride will remove it. (Carbon tetrachloride is preferable, being non-inflammable.) It is not necessary to permit the coils to be soaked in the solvent — wiping off with a fairly wet cloth is as a rule effective. But no machine should ever be allowed to get into such a state of neglect, anyway.

Be Systematic

Have a regular inspection schedule. For brushes, once a week should be enough. Once a month may be quite enough to check up on other details. Once a year may be sufficient for ball bearings. It depends on conditions. Anyway, decide how often each part should be checked up — and then stick to the schedule. Regular inspection and maintenance cost money — but an unexpected shutdown costs more.

Equipment Designs for the Pickle House. Men engaged in the pickling of all types of metals will be interested in this 24-page catalog which is now being issued by The International Nickel Company, Inc., 73 Wall St., New York, N. Y. Since the material handled by pickling departments varies from large, heavy blooms through light, bulky hollow ware to the smallest nails, the variations of pickling equipment are numerous. Pickling equipment usually is designed and built to do a particular job. Information on engineering properties, corrosion resistance, and fabrication is given within this 24-page catalog which includes illustrations of operating equipment and new designs all arranged according to the class of material being handled.

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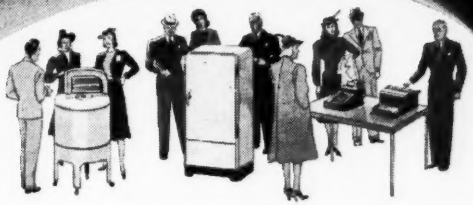

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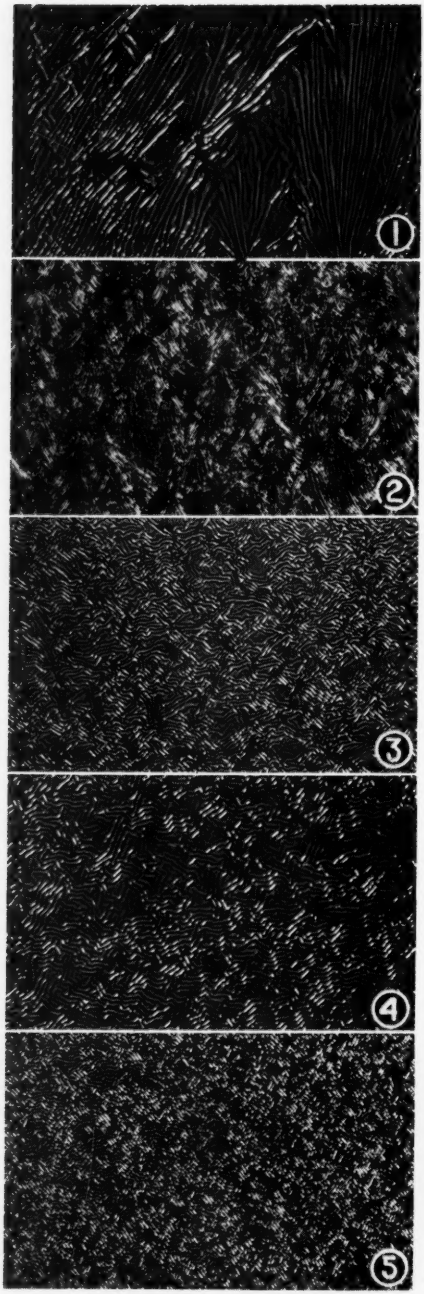

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Sag Wrinkle

Available in Heavy, Medium

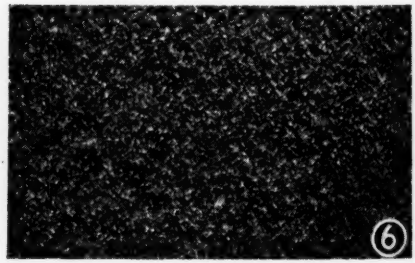
Sag wrinkle has the appearance of draped curtains. It is a combination bakelite, varnish and synthetic base. In applying it to metals and other materials which will stand heat, it must be sprayed heavy enough to create "runs." It is then baked at 225 deg. for three hours.

Pine Tree Wrinkle

Available in Heavy, Medium, Small

Pine Tree Wrinkle, as its name implies, looks like miniature pine trees

(1)—Sag Wrinkle
(2)—Pine Tree Wrinkle—Medium
(3)—Uniform Wrinkle—Extra Heavy
(4)—Uniform Wrinkle—Heavy
(5)—Uniform Wrinkle—Medium
(6)—Uniform Wrinkle—Small



--A Wrinkle Finish

uniformly distributed over the entire finish area. Heavy, medium, or small design is governed by the amount of material sprayed, adjusted at the nozzle of the spray gun. It is caused by very small "runs" which set immediately when heat is applied. It requires a bake of three hours at 225 degrees.

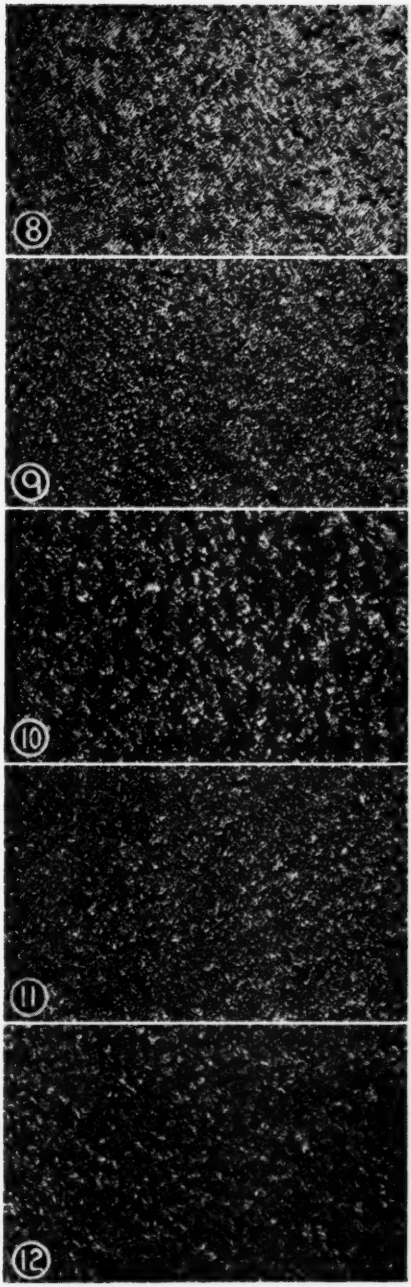
Uniform Wrinkles

Available in Coarse, Medium, Small, Very Small

Uniform Wrinkle is the typical small wrinkle more universally applied. It establishes uniform design over the entire finished surface with each individual wrinkle identical in size and character. Typical products on which this wrinkle finish is used include: automobile radios, air conditioning equipment, heating units, metal boxes of all kinds, medicine cabinets, business machines, and so on.

The wrinkle which comes under this

(7)—Uniform Wrinkle—Very Small
(8)—Opalescence Wrinkle—Fine
(9)—Opalescence Wrinkle—Fine
(10)—Birdseye Wrinkle—Heavy
(11)—Birdseye Wrinkle—Medium
(12)—Birdseye Wrinkle—Small



specification is classified as coarse medium, small and very small. Unlike specification is classified as coarse, sag or pine tree wrinkle where one formula accomplishes a variation in the wrinkle, each classification under uniform wrinkle represents a different formulation with each applied in the same manner with the same nozzle setting on the spray gun.

Where synthetic formulations are used, it is only necessary to bake a uniform wrinkle for one hour at 225 degrees.

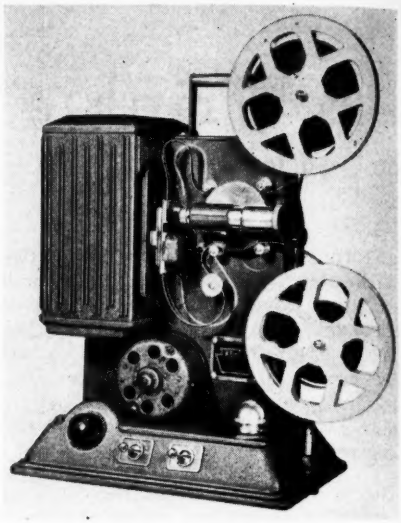
Opalescence Wrinkle
Available in Coarse, Medium, Small, Very Small

Opalescence wrinkle is the same basically as uniform wrinkle. The difference in finish is acquired by adding opalescence to the uniform formulations to give them a more varient color effect such as an irridescent array of pearl-like colors, as contrast to solid colors.

Birdseye or Fisheye Wrinkle
Available in Heavy, Medium, Small

Some call it "birdseye" — while others refer to it as "fisheye." Both describe a wrinkle finish of exceptional character to be found on such products of high quality as laboratory equipment, aircraft instruments, coin banks, beauty parlor equipment, clocks, door chimes, and so on.

(Photo Courtesy Underwood Elliott Fisher Co.) The new Underwood Master Typewriter illustrated here, as well as the new Underwood Universal Typemaster Portable, reflects the distinction afforded by Wrinkle Finish.



(Photo Courtesy Keystone Manufacturing Co.) The Keystone Projector illustrated here is typical of the practical use of Wrinkle Finish. Not only does it enhance the appearance of these popular projectors, but surplus heat not dissipated by the built-in fan cooled ventilation will not destroy or mar its tough surface.

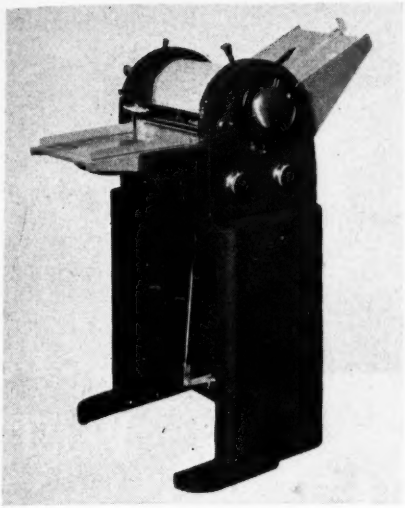
Birdseye, or Fisheye, wrinkle requires more care in application than any of the other wrinkle finishes, but does not offer complications if the product finisher practices judgment in its use.

While varying effects are obtained based on the size of the "eyes" desired, but one formulation is required. The variation is derived from the amount of material sprayed.

The product is then put into the oven and baked for one-half hour in a heat of 100 to 150 deg. This sets the "eyes" and it is now ready for a three-hour bake at 225 degrees.

Pastel Versus Standard Colors

Regardless of the effect desired,



(Photo Courtesy Ditto, Inc.)
This latest model Ditto Duplicating Machine is finished with Rincon-Trol, a new type wrinkle-textured enamel.

one caution has to do with the colors selected. When pastel shades are chosen care must be exercised against overheating. Because of pastels being delicate, too much heat has a tendency to burn the colors, thus destroying original intentions. This is not true of standard colors, as their pigments are basic and not a combination to arrive at a delicate result.

Because of the unusualness of wrinkle finishes, there is a tendency to feel it is difficult to apply in order to obtain uniform results. This is not true. Wrinkle finish, without a doubt, is easier to put on than any other finish. The only two things that must be watched are—a clean spray gun nozzle so the spray will come forth uniformly—and uniform heat throughout the oven.

Other than this, and it is repeated again here for the sake of emphasis —wrinkle finish is easier to put on than any other finish.

For instance:

—the product finisher does not have to be as careful about avoiding "sags" or "runs."

—the product finisher does not have to be so careful about dirt or dust in his finishing room. Other finishes require spotless conditions or the entire finish would be destroyed.

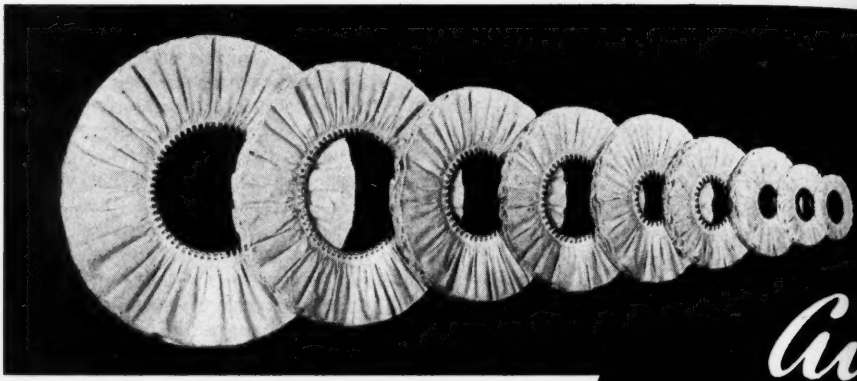
—if there should be flaws in a wrinkle finished surface, they are not apparent to the naked eye.

—wrinkle finish is a one-coat application, therefore enabling the product finisher to practice maximum economy in his finishing department.

—this economy is carried further by enabling the product manufacturer to use inexpensive metal, as wrinkle finish fills all of the seams and hides other flaws under a full-bodied one-coat finish of exceptional durability. This also does away with priming, sanding and surfacing.

This information has been made available through the co-operation of New Wrinkle, Inc., Dayton, Ohio.

(Photo Courtesy The Hoover Company)
The new model 150 Hoover Vacuum Cleaner is achieving striking appeal with its smart application of Wrinkle Finish. The finish is used over a magnesium die casting with a coat of baked primer applied first.



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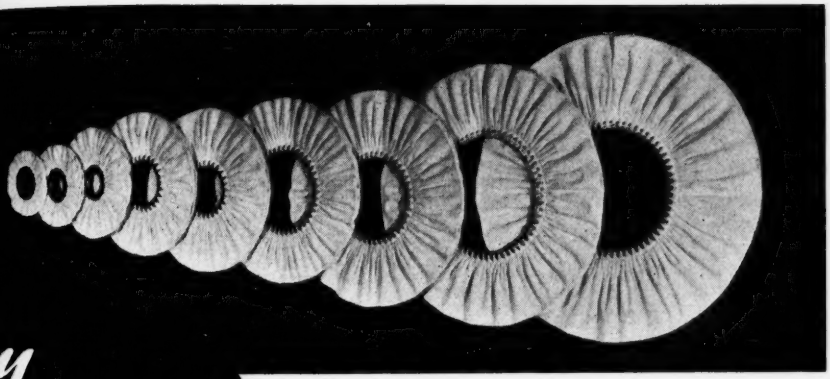

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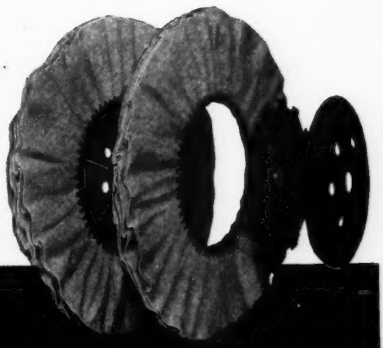

Barrel Finishing of Metal Products

The importance of barrel operations for resistance to wear and corrosion of plated surfaces.

By H. LEROY BEAVER

IF we were to take any given group of platers or operators of burnishing barrels and ask them this question: "What, in your opinion, is the most important factor in a barrel finishing operation given to an electroplated surface?", the answer would undoubtedly be, as it invariably has been, "The securing of a highly lustrous or polished surface." Unfortunately, this answer is incorrect because the securing of a highly polished surface is certainly secondary to a far more important factor, and that factor is the effect of the barrel operation in providing for additional wear and against corrosion from whatever cause it might arise. Now, if we should state that all electroplated surfaces, that is, where a metal is electrodeposited on a base metal, that such electrodeposited coating is porous, we believe that such a statement will be concurred in by all of those familiar with the electroplating process. As much as we all should like to answer "no" to this proposition, our answer needs must be "yes." No plated surface can be considered as stable until the thousands of tiny pores that reach through the plate to the base metal can be permanently closed to prevent the entrance to the base metal of corrosive elements that will attack the base metal and thus cause ultimate failure of the plated surface.

H. Leroy Beaver

Some operators seem to feel that color buffing will cure this condition, basing their thought on the theory that, in this operation, the surface of the metal coating is caused to flow along the line of least resistance and that in so doing the pores are closed and that such an operation in itself is sufficient to warrant a complete degree of permanency of the plated surface. That this is not true can be readily determined by any of the ordinary corrosion tests in common use today. One of the tests of this

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type is in the salt water spray test.

In color buffing, the object, of course, is to secure a uniform surface appearance by the removal of a part of the surface by abrasion, but with the human element to be considered, the pressure exerted by the operator of the part against the rapidly revolving buff is one of degree and lacking in uniformity. In corrosion tests made on color buffed test pieces, it can be clearly seen where variation of pressure against the buff creates varying conditions, and certainly there is one point where the pressure against the buff as relates to the peripheral speed of the buff itself causes a clean cut which leaves the porous area identically the same as though no buffing operation had been given, and on such areas, failure will be indicated when the part is subjected to the average corrosion tests.

Now, let us consider a barrel finishing operation for the elimination of the porosity of a plated surface, and here we have an entirely different combination of forces than we could have in any color buffing operation. A mass of burnishing material in a barrel exerts great pressure both when at rest and when in motion and this can be readily appreciated if the reader will try to force his hand down through the mass to the bottom of the barrel. Perhaps we can best express this by saying that with an appropriate barrel operation the thickness of the plated surface may be made to vary anywhere from .000075 in. to .00025 in. B.C. This is due to the pressure within the mass acting against the plated surface and altering its degree of plasticity by not only compressing the grain of the surface coating, but also in closing the pores in such coating, thus making the coating not only more resistant to corrosion but also more resistant to wear as well.

We believe that no clearer demonstration of this truth could be found than that in what we term the food service field, that is hotels, restaurants, institutions, and so on, where barrel burnishing is the generally accepted method of not only burnishing for fine appearance, but also for prolonging the life of the plated surface. It seems almost unbelievable that prior to the adoption of barrel burnishing in this field, the average life of plated silverware was considered as six years, at the end of which time replating was considered as a thing to be expected as a matter of course.

As we look at this field now, we find scores of cases where plated surfaces have withstood both wear and corrosion for periods of anywhere from twelve to eighteen years, and if this is true of plated surfaces in the food service field, then it must be equally true of plated surfaces in other applications. If any reader should question the efficacy of a barrel operation for securing this result, he need only plate three test pieces. One may remain "as is," one may be "color buffed" and the third "barrel finished." Now, if the three pieces are subjected to salt spray or other corrosion test, it will be readily apparent at the conclusion of the exposure that the barrel finished piece will show very marked superiority for resistance to corrosion.

All of the foregoing brings us to the discussion of a question that has kept bobbing up all through this entire series of papers and that is in connection with the comparative results to be secured through the use of the high and narrow type of barrel as distinguished from the long and narrow type of barrel, or perhaps we might better express it as between the Abbott and Baird Types,

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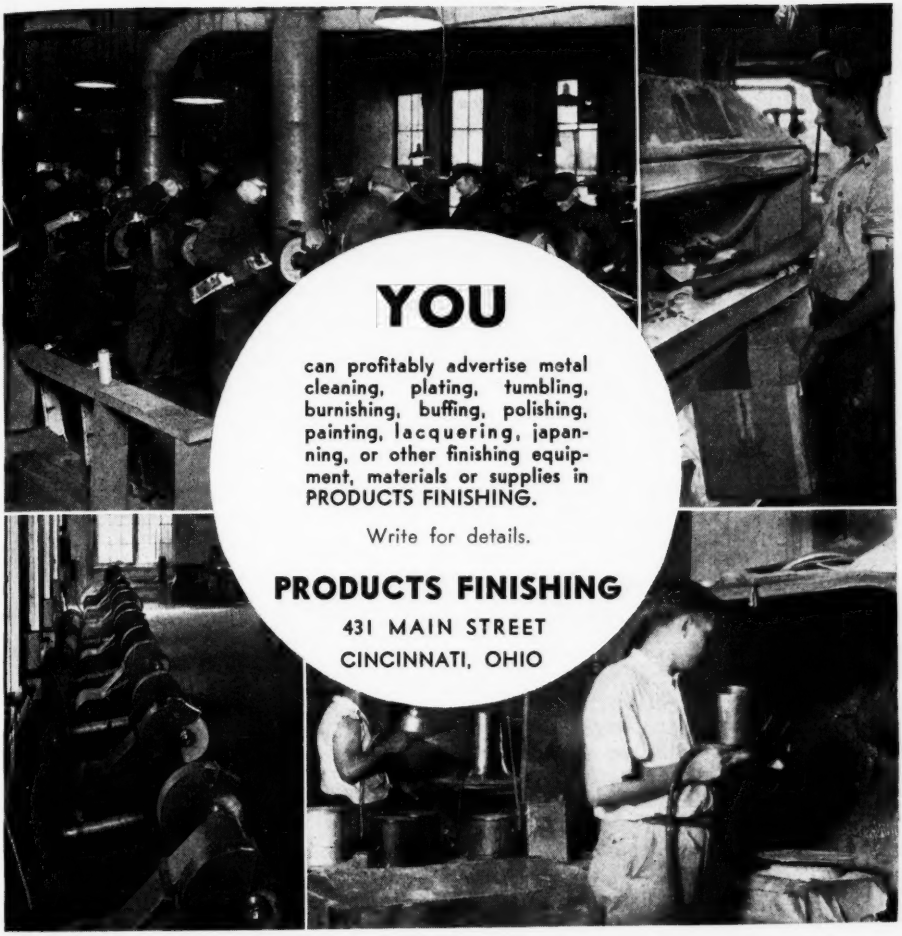
and we use these names as designations simply because these two are considered the originals of each particular type. For some reason, barrel operators in speaking of the size of barrel they use merely give the size designation as they see it. As an example, in all the correspondence we have had during this series it has been difficult for us to determine what type of barrel is being used, simply because the operators choose to designate two types of barrel exactly the same. An 8 in. x 24 in. Baird is, of course, given that description, but a 24 in. x 8 in. Abbott is also termed an 8 in. x 24 in. barrel. We believe that when some series of standards is reached by the American Electroplaters Society it should include a note that in designating barrels the figure representing the diameter of the barrel should always come first, and this would eliminate a great deal of confusion.

But now for a comparison of the two barrels as noted. The high and narrow barrel, which is as we have said designated as an 8x24, is 8 in. wide and 24 in. across the faces of the octagon sides of the barrel, and such a barrel nominally carries three hundred pounds of burnishing material not counting the load of parts to be burnished. On the other hand, the long and narrow type also designated as an 8x24 carries a nominal load of one hundred twenty-five pounds of burnishing material not counting the load of parts being burnished. Theoretically, in one revolution of the high and narrow type of barrel, the parts being burnished will travel a total of six feet through the burnishing mass, while in the long and narrow type the travel will be but three feet through the mass for each revolution of the barrel.

Thus, you will note that operating at 24 r.p.m. we would have 144 feet of travel per minute for the high and narrow type as against 72 feet of travel for the long and narrow type, and thus it will be seen that for the long and narrow type to equal the foot travel per minute of the high and narrow type would involve stepping up the speed of the long and narrow barrel to just twice that of the high and narrow type or to 48 r.p.m., and for many parts this would be an excessive speed. The most important difference to be noted, however, is that even though the foot travel of the parts through the mass is the same, in the high and narrow type this travel is accomplished against the pressure of 300 pounds of burnishing material confined to an area only eight inches wide, while in the long and narrow type the pressure is exerted by only 125 pounds of burnishing material which is spread out over a length of twenty-four inches.

The reader will thus be able to judge for himself which of the two types will be the most efficient for producing the pressure within the burnishing mass sufficient to effect an alteration in the degree of plasticity of the plated surface sufficient to close the pores in the metal coating for resistance to wear and corrosion. It must be remembered that this pressure as exerted is one of degree and is directly proportioned to the size of the barrel, the weight of the load of burnishing material and the speed of the revolution of the burnishing mass as it flows around the center of the axis of the barrel. A burnishing barrel does not "roll," but revolves around its own axis. A mass of burnishing material within a barrel does not "roll," but flows around the axis of the barrel, and the burnishing balls or shapes do not roll over the surface of the parts being finished, but the finish is secured by



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pressure from within the mass in resistance to the parts seeking to pass through it. And following this, it must be apparent that greater, rather than lesser pressure is a paramount consideration in carrying out the barrel process if we are to secure the ultimate in results insofar as such results respect the clogging of the porous surface of the plated surface to secure the greater resistance to corrosion and wear. To cite an example, we might say that in the food service field, of which we have been commenting, that average hollow ware, such as coffee pots, tea pots, vegetable dishes and like parts, are invariably operated in a barrel 17 in. in diameter and 24 in. long with a load of 420 pounds of steel burnishing materials and from this the barrel size is stepped up and for platers and other like larger parts, the barrel size may be as much as 24x24 and carrying a load of burnishing material of 1,020 pounds, and this without distortion of the parts in any way in the burnishing process.

All the talk of a large barrel with a heavy load of burnishing material causing appreciable permanent deformation of the parts being operated upon may be a case where the wish is father to the thought. The most prolific cause for distortion of parts in operation is too high a barrel speed, coupled with too light a load of burnishing material. If the quantity of burnishing material is sufficiently large to envelop the parts being finished and the barrel speed is properly regulated, there is little cause for fear of distortion. Let us try to clarify this a bit by saying that the parts being burnished are enveloped in the mass of burnishing material, and that while there may be considerable pressure behind the part, it is equally true that there is the pressure of the resistance of the mass ahead of the part and it cannot be considered that the pressure is all in one direction without any opposing force whatever. Maybe we could use a rather homely illustration by saying that to those of the readers who have watched a boxing match there are times when one opponent strikes another what appears to be a stunning blow, but the other being in perfect balance, will "ride out the punch" with no apparent injury, and this is equally true of a part being burnished. If the load or balance is right and the barrel speed right, then the danger of distortion is materially lessened.

As we look back over twenty-eight years of continuous study of barrel burnishing and its various functions, we cannot help but be struck with the fact that all of our research tends towards the use of larger barrels and greater loads to assure greater resistance to wear and corrosion, that the proportion of long and narrow type of barrels on the market compared to high and narrow types is nine to one. Why this should be, we do not know. Perhaps a lot of the makers of the long and narrow or Baird type are not familiar with the fact that this barrel was developed for a specific purpose, and that purpose was to handle the parts made from what we might term wire or ribbon material on other machines produced by The Baird Machine Company, or in other words, the Baird barrel was a part of the Baird process for the production of light gage formed parts, but those who have copied this type have fallen into the error of recommending this type of barrel for any and all classes of barrel finishing work. We would not in any sense deny the excellence of the Baird type of barrel so long as its operation is confined to such parts as its originators intended, but where we are working

on heavier gage materials and where greater pressures are required, then certainly larger sizes of barrels are definitely indicated. As an evidence of this, we might cite a case of a company with which we were long connected and where 8x30 barrels were almost exclusively used. Now, the trend is to larger equipment to the extent that this same company are now successfully operating barrels 30x70 in. in sizes and that carry up to two tons of burnishing materials.

The important function of effecting a variation in the density of the plated surface by pressure of a burnishing mass to vary the degree of plasticity of that surface cannot be accomplished by operating the parts in barrels that are underload as repects the quantity of steel burnishing materials used. In the course of any year, we are called upon to visit many plants in connection with the solution of barrel finishing problems. Suppose we should say to the average operator something like this: "We live on a farm and we would like you to forget plating for awhile and come up to the farm for a change, go into the barn and pick out the best draught horse in the line, then put this horse on half rations, and whether plowing, harrowing, or any other operation, drive him at top speed continuously." Such a suggestion would involve nothing short of insanity, and yet in the greater part of the plants we visit, we find barrels being operated at even more than half underload and at too great barrel speeds.

Remember, that your burnishing barrel is the draught horse of your production line-up and, if you operate this piece of equipment at half its nominal load, you need expect nothing

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but half-efficient results. Merely because a barrel manufacturer says "Operate at 45 r.p.m.," it does not follow that this speed is to be used on any and all classes and kinds of parts, because it would be just as sensible for an automobile maker to say "This car will do eighty miles per hour and you drive it at that speed under any and all conditions both in city traffic and on the open road," and yet that is exactly what a large proportion of barrel operators demonstrate as their conception of proper barrel operation.

While most other pieces of equipment in the average plant are installed in such a manner that they may be operated at variable speeds, we find burnishing equipment installed to operate at one speed only and that generally the one suggested in the catalog of the manufacturer. This can only indicate one thing, and that is, a lack of understanding on the part of the barrel manufacturer himself as to the importance of the use of a variety of speeds to fit the particular parts being operated upon in the barrel.

We are firmly of the opinion that if barrel operations were properly understood there would not be a single plant in the country where electroplating was practiced that would not also have its proper complement of barrel finishing equipment to assure the permanence and longer wear of the plate as deposited in that plant.

All through this series we have received innumerable requests from operators of job plating shops asking us to suggest what we would consider the best barrel size to install for general classes of work such as come to the average job plater. It will be remembered that in an early paper in the series we stated that some of the finest research results we ever secured were in a barrel of the Tahara type 17x24 in size. A year ago we would have hesitated to suggest what we consider a most satisfactory size for general application, lest we be accused of favoritism for a given type of barrel, but now with the advent of the new end opening barrel by Belke which is 17x27 in size, we can frankly say that we believe for average job shop operation, we would suggest the 16x24 or 24x24, carrying 600 and 900 pounds of burnishing materials, respectively, of the Abbott type or the 17x27 Belke type, carrying 500 pounds of burnishing materials. Either of these barrels carry sufficient load to give the pressure required to alter the plasticity of the plated surface, close the pores always present in a plated surface and prolong the life of the plate as well as to give it the maximum of protection against corrosion. In these barrels, the load is well and evenly distributed in proportion to the size of the barrel and, when either type is operated at speeds of from 18 to 24 r.p.m., the maximum of results may be expected.

For heavy production work and where large quantities of parts are to be processed, then we believe we would be stating the fact when we say that the tendency is towards larger barrels, both in width and diameter and heavier loads. As we approach a better understanding of the really important features of barrel finishing, we needs must recognize that light loads can give only light pressure and that while we may secure a polished and lustrous surface finish, this does not by any means indicate that we have used sufficient pressure to close the pores in the plated surface, and the trend is toward the larger types such as the 30x16 single barrel, carrying a load of 800 pounds, and the 30x16 double,

carrying a load of 1,600 pounds of burnishing materials. The impression gained in some quarters that where there are only small lots of parts to be operated upon that only a small barrel is required is, of course, a fallacy, for even on small loads of parts, sufficient pressure is necessary to effect the proper surface alterations, and this pressure cannot be obtained with the small lightly loaded barrels.

---

80 Ways to Make More Money. Eighty actual cases of Cuno continuously cleanable filters at work in industry are illustrated in this book which is now being distributed by The Cuno Engineering Corporation, Meriden, Conn. This book is a summation of many years of practical engineering in filtration. By telling of the work Cuno filters have done, the work the filters can do is better understood.

For the convenience of the reader of the book, it has been indexed in three divisions to cover industry broadly: Process, Power, and Heavy Industries. One section is devoted entirely to the design engineer who, in many cases, works in all fields.

A copy of "80 Ways to Make More Money" will be sent free to any finishing department executive who will send a request written on his firm letterhead.

"Disc Grinding" is the title of a 28-page booklet now being distributed by Norton Company, Worcester, Mass. In discussing disc grinding as a production operation, the text takes up in turn the subjects of mounting conditions, types of discs available, perforated discs, and applications. A section is devoted to cylinder type wheels for vertical and horizontal spindle surface grinders and plain grinders, and instructions are given for mounting a cylinder type disc on the different types of surface grinders. A table of recommendations suggests, by wheel markings, the proper wheels to use for grinding everything from aluminum castings to wrench heads. Copy free upon request.

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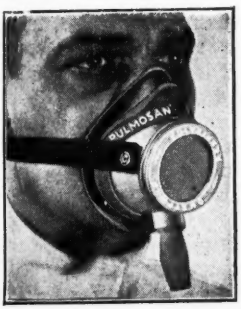

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How to Get Better Results with Drying Ovens

When buying an oven — proper care and use — important technical and pertinent ideas and pointers for improving the plant's work — are the important factors discussed in this article.

By Frank V. Faulhaber

THE modern plant operates under great handicap when using obsolete heating equipment, or when the equipment, however superior it be, is not maintained in the best possible condition. It is essential, too, that heating apparatus be used properly. For example, consider drying ovens. Too many times operators manifest carelessness or disregard in taking care of the ovens in such a way that they will function with maximum efficiency. One of the most important points today is to scout the market for quality drying ovens, selecting such as are most appropriate for the plant's particular purposes. The management should not be in too much of a hurry.

By procuring the right kind of drying oven, many of the plant's problems will be solved. There will be no necessity for any dismantling and returning of unsuitable ovens, with all the attendant waste of time, effort, patience, and money. Due care, and calm choosing, will forestall much disappointment and save the plant heaps of trouble. Quite frequently a plant is held back by reason of some unsatisfactory equipment, which must be changed, a matter that so easily might have been prevented.

The object is to secure from manufacturers and their representatives all possible information and data in connection with drying ovens. Salesmen have at their finger tips many valuable and pertinent pointers, ideas and suggestions, incident to the purchase of the right kind of oven. Get facts, statistics, obtained perhaps from other plants, maybe in the same city, as to results attending use of the manufacturer's drying ovens. Make comparisons. Consult with others, discuss; thresh over everything in any way pertaining to the most desirable drying oven, so that the right kind of drying oven, for the plant's purposes, will be an assurity.

The superintendent of one large heating plant can visit other plants within easy reach, to meet different executives, and to observe in operation the various drying ovens in use, and as used. The host of technical information that he thus picks up can best be appreciated by those executives who periodically call upon others in the business, at the same time swapping ideas, getting knowl-

edge first-hand, and thus being positioned to formulate a better opinion and decision regarding purchases for their own plants.

So much can be accomplished in this way it is surprising that more in the business will not take time off for the procedure. It involves time, of course, but in the end it pays. Progressive plant executives know that by finding time for such matters much time is later saved, for themselves, and also for the plant. And this step applies with regard to purchase of any kind of plant equipment, and also relative to plant problems that come up in one way or another during the business day.

It is advisable to follow manufacturer's instructions in regard to the proper care and use of drying ovens. To this end, the operators, and all those having in any way to do with the ovens, should be duly taught and reminded, so that each, individually, will know what is expected, that the best possible drying results will be finally obtained. Close co-operation here, on the part of all, will secure for the plant the sort of efficiency calculated to speed up the drying operations and generally help to facilitate the work. All details, however small, in connection with the drying ovens, should be faithfully regarded.

Many times, the painstaking care put forth by earnest plant operators is neutralized by succeeding operators at the drying ovens. In one large metal specialties plant, considerable trouble with the ovens was experienced for a length of time. Much of the disappointment was the result of dusty atmosphere right near the drying ovens. These heating contrivances were accountable also in part. The management decided to install

quote:

"... any moving part made of steel will function more smoothly and with less friction if 'Pentrated'..."

Full details in the **"BLACK"** bulletin

HEATBATH CORPORATION, Springfield, Massachusetts

new ovens, and that better care was to be taken. The move, to this date, has not been regretted.

The method now is to clean the ovens at least twice a week, depending upon the amount of work put through. This was a routine hitherto unthought of in the plant. Now the practice is followed diligently and unfailingly. The foreman of the finishing department discontinued the painting of the interior of an oven, declaring that eventually the coating would flake, and flakes would drop and adhere to the work.

Much of the plant's products often contains particles because of unclean, dusty ovens. However minute, these interfering specks do not make for satisfactory quality workmanship. By giving a brisk rubbing and cleaning to the entire interior of the oven, including all the fixtures that too often are given but lax cleaning, improved work will be the result. Racks, rods, hooks and corners should be thoroughly, carefully cleaned, using benzine or turpentine, or some other good cleaning fluid on a rag to remove hardened scale. By spraying uniformly with water, then turning on heat for about half an hour, a cleaner oven will be the result. It would be a sensible policy to maintain in the plant extra ovens, depending upon the plant's output and capacity, to cover any emergency, and so as to permit proper and regular cleaning. The added expense would be nominal compared to returns.

Dust and other objectionable particles can be quickly removed by using a vacuum cleaner, thus making for a satisfactory job. In conjunction with this cleaning, care should be exercised by the workers to keep down the dust as much as possible. Opening and closing the doors hurriedly adds materially towards specked work.

Dusty operations, such as the application of asphaltum powder on printed, etched metal plates, is one outstanding reason why adverse work is the outcome at the finishing operations. Avoiding drafts, especially while finishing is being done, will reduce poor work at the operation. All paraphernalia about the finishing operations should be as free of dust as possible under the working conditions. Periodical supervision and attention to this responsibility will certainly assure a better grade of work. The extra care, conscientiously exercised, will have its salutary effect on the plant workmen, who should turn out better workmanship.

In some plants, the work must be transported too far, at cost of time and spoilage or impairment of the product. Particularly is this something to avoid in connection with the drying and heating processes in the plant. At the drying ovens, there frequently will appear on the work "stipplings" and specks. The shorter the distance to the ovens, the quicker the work can be conveyed thereto and the better taken therefrom. Sometimes, for instance, spraying is done under very trying conditions, thus hampering the operator; then the best oven cannot provide high-grade baking. When working conditions are excellent, both in the interests of the operators and the product, the finished work will measure up much better, and there will be few complaints because of spotted and flecked articles.

Plant executives, experienced in the purchase and use of drying ovens, have found that the oven apparently "too expensive" is infinitely the cheaper in the end. It is also a matter of always taking the right care of the drying ovens. Small plants sometimes do well when they design and make their own ovens, or by es-

pecially ordering such, but the procedure entails an art and requisites peculiarly its own. The drying oven should not be a shaky contraption. Vibration at the drying operations is a serious drawback and only hinders the operators. A vibrating oven is a liability and a constant annoyance to those working with it. It is well to bear in mind that plans in connection with drying ovens must be in accordance with Health Department regulations.

The ventilation of ovens must be right and unobjectionable from the workmen's standpoint and also that of the people living in the plant's vicinity. Drying ovens should also have a uniform distribution of heat to make for satisfactory work. There are many important details to be borne in mind and to be respected, and it is realized that each plant will have its own peculiar problems that must be worked out in the best possible manner.

Our Apologies

In publishing the article "Abrasive Finishing of Stainless Steel," which appeared in our January issue, the author's name was given as Bartlett West. This was in error; the author of the article was Mr. James Lindsay of The Abrasive Machine and Supply Co.

Data Folder on Mixing Operations. The Eclipse Air Brush Co., Inc., Pneumix Division, 390 Park Ave., Newark, N. J., has just issued a 6-page illustrated data folder on the performance of its Pneumix air-motored agitators in laboratories and industrial plants. Copy free upon request.

Improved M-B Super-Speed Air Grinder. M-B Products, 130 E. Larned St., Detroit, Mich., is now issuing a 6-page catalog describing and illustrating the Improved M-B Super-Speed Air Grinder. This unit is 14 oz. in weight and is capable of attaining speeds as high as 100,000 r.p.m.

The body of the Improved M-B Super-Speed Air Grinder is of streamline design and is said to afford the utmost ease in handling. This model grinder handles grinding wheels, cutters, rotary files, and so on with ⅛ or ¼ in. diameter shanks.

Copy free upon request.

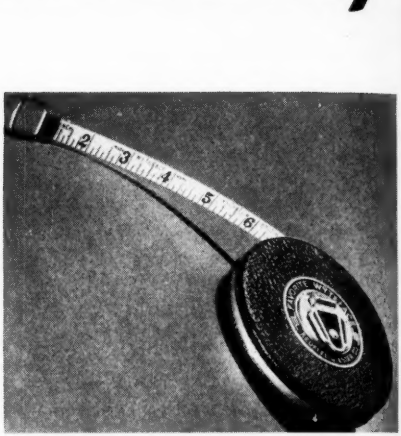
Mention PRODUCTS FINISHING when writing to advertisers. Your co-operation will be appreciated both by the advertiser and this magazine.

The laboratory is the "brains" of the DeVilbiss hose plant. Development, cost and improvement of the hose are a few of the functions for which this department is responsible.

(Photo Courtesy The DeVilbiss Company)

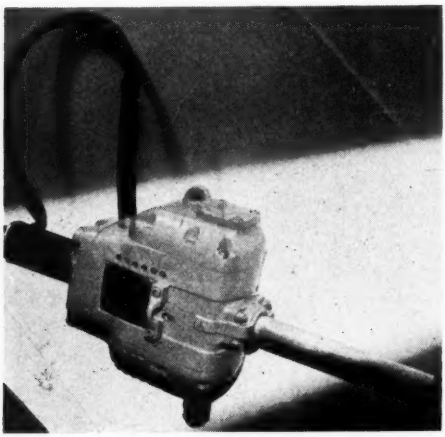
FINISHES *that aid in Appearance & Utility*

(Right)—A great convenience and a valuable safeguard against costly errors is provided by means of this measuring tape which has black graduations on a crack-proof white surface. The white surface is firmly bonded to the steel, thus protecting the base metal from rust and corrosion and greatly increasing the life of the tape.



(Photo Courtesy Keuffel & Esser Co.)

(Photo Courtesy Designers for Industry)



(Left)—A pneumatic tool used for running nuts by power on assembly lines which is streamlined with smooth contours. The finish is standard machine tool gray enamel.

(Right)—The realistic linoleum background which graces four sides of the Ultra Gloss No-Rubbing Floor Wax can leaves no doubt as to the purpose of the product. The tile type red-brown linoleum chosen for this prize-winning can was ascertained through surveys, and executed in realistic lithography.

(Photo Courtesy Modern Packaging)

(Below)—An all electric kitchen showing the application of beautiful black and white enamel. The handles of the cupboards and electric range, refrigerator, and dish washer are chromium plated.

(Photo Courtesy Westinghouse Electric & Mfg. Co.)

NEWS of the Industry

C. I. Packer Elected President of Meriden Manufacturers' Association

According to a recent announcement, Mr. C. I. Packer, president of The Packer Machine Company, Meriden, Conn., has been elected to the office of president of the Meriden Manufacturers' Association, which is a member of the Connecticut State Manufacturers' Association. The Packer Machine Company, manufacturers of automatic polishing and buffing machines sold under the trade name of "Packer-Matic," are members of the National Association of Manufacturers.

Metal Cleaning Problems Discussed at Oakite Conference

New developments and improvements in cleaning methods, materials and equipment were the principal topics discussed at a two-day conference of the Division Managers of Oakite Products, Inc., 20 Thames St., New York, N. Y., recently held at their headquarters' office.

Two subjects of major interest dealt with cleaning materials now available to effectively resist chromic acid contamination, and the elimination of water spots on plated work. Also discussed was steam cleaning of heavy machinery and equipment, floors, walls, and other plant maintenance work.

Division Managers present were D. X. Clarin, New York and Northeastern Division; J. J. Basch, Philadelphia and

Oakite Service Department Manager, Mr. L. B. Johnson, discussing the new solution-lifting steam gun before a group of Oakite Division Managers and company executives.

Southeastern Division; J. C. Leonard, Chicago and Southwestern Division; H. C. Duggan, Detroit and Midwestern Division; and P. A. Boeck, West Coast Division. Also attended by the company executives, the meeting provided an opportunity for a thorough exchange of ideas concerning all phases of sales and technical service work.

Alrose Chemical Company Moves to New Address

The manufacturing plant and laboratories of the Alrose Chemical Company and Mark Weisberg Laboratories have recently been moved from their former Providence, R. I., location at 80 Clifford St. and 92 Pintery St., to a new and enlarged factory located at 180 Mill St., Cranston, R. I. This new plant has 40,000 sq. ft. of working space with laboratories to accommodate eight chemists.

Among the processes and plating solutions which have been produced by Alrose Chemical Company and Mark Weisberg Laboratories are wetting agents, waterproofing compounds, and also a simple immersion finishing process known as "Jetal" which provides iron or steel products with a lustrous, rich black coating. The Jetal process not only serves as a decorative finish, but also as an effective rust resistant and an excellent base for subsequent finishes such as paints, lacquers and enamels.

Included among the other solutions offered by this company to metal finishers are Rhodium, White Gold No. 2, Wite-Brass, Bon White, and Gold Smut Base.

Newly Formed Udylite Corporation Acquires Bright Nickel Corporation

According to a recent announcement, all the capital stock of the Bright Nickel Corporation, Detroit, Mich., owners of the basic Schloetter patents covering the bright nickel plating process, has been acquired by the newly formed Udylite Corporation, Detroit, Michigan.

Preceding the acquisition of the capital stock of the Bright Nickel Corporation, The Udylite Company formed a new organization to be known as The Udylite Corporation, which has taken

"Speedip"

WHIRL ENAMELER

Saves Time -- Saves Enamel

● A combination dipping-whirling machine for completely coating large quantities of small parts with lacquer, enamel, paint, etc.

All operations are within the machine. Parts are dipped into coating material, raised and whirled. Time as little as 30 seconds. Speeds up production—cuts finishing costs —saves lacquers and enamels.

Write for further details or send samples to be coated.

F. RONCI COMPANY

45 RIVER AVENUE • PROVIDENCE, R. I.

over all of the business and assets of The Udylite Company. This company is widely known as one of the leading plating and polishing supply and equipment houses in the country.

The advantage of the bright nickel process results from plated work coming from the plating bath bright and shining. The Bright Nickel Corporation will be operated as a wholly owned subsidiary of The Udylite Corporation.

The personnel and policies of The Udylite Corporation will remain the same as those of The Udylite Company, which it supersedes, and the same management will continue. Officers of the new corporation are as follows: Charles Awkermann, chairman of the board; L. K. Lindahl, president; C. H. Reeme, vice-president; and Horace Maynard, secretary.

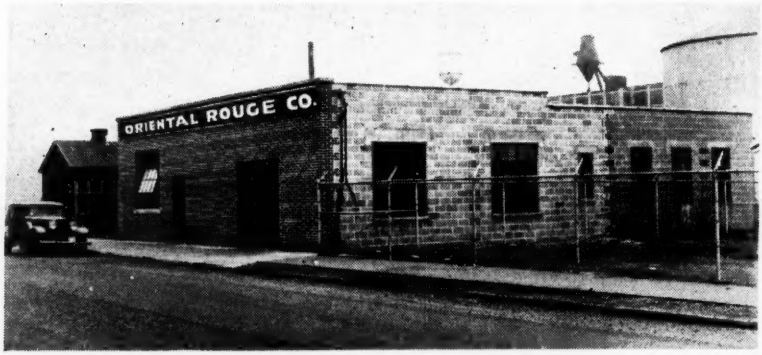
The new Corporation, through the acquisition of the Bright Nickel Corporation, can now offer the metal-finishing industries a more complete range of products and processes, increased technical facilities as well as an organization equipped to handle a more rounded-out variety of metal-finishing problems.

Hilo Western Sales Conference

Hilo Varnish Corporation, 42-60 Stewart Ave., Brooklyn, N. Y., recently held a conference of its entire western sales staff. The meeting, held at the western branch office, 2420 Washburne Ave., Chicago, Ill., was under the personal supervision of Dr. Mattiello, technical director. A general discussion of the new Hilo products on the market proved very beneficial. Plans are under consideration to hold such conferences every three months.

Oriental Rouge Co., Inc. Announces Addition to Plant

Oriental Rouge Co., Inc. has recently announced the completion of a new addition to their plant which is located at 66 Pine St., Bridgeport, Conn. The new space has been made necessary due to the demands for increased production of rouges for polishing stainless steel, silver, gold and other metals.



A view of the new addition recently made to the Oriental Rouge Co., Inc. plant

Mr. Otto H. Loven, consulting engineer and chemist, was recently appointed by this company to handle analytical, chemical production and research work for plating plants and departments.

DeVilbiss Training School

The DeVilbiss Company, 700 Phillips Ave., Toledo, Ohio, announces the schedule of its training school for the first half of 1939.

This school is open to industrial painters, master painters, automobile refinishers and all others interested in learning the technique of spray painting, and the use and care of spray painting equipment.

The training period lasts for one week. Classes will start on the following dates: March 13th, April 17th, May 15th, and June 5th. Special rates in Toledo hotels and boarding houses near the

plant have been secured by the company for men attending the school.

The classes have been well attended in the past because of the facilities for study, otherwise unobtainable, offered by the DeVilbiss Laboratories.

It is advisable to enroll in the school as far in advance as possible, since the size of the classes must be limited and since there will be no training periods other than those announced.

Porcelain Enamel Institute Launches Enlarged Promotion and Publicity Program

In launching its enlarged promotion and publicity program for 1939, the Porcelain Enamel Institute, Chicago, announces the appointment of Paul W. Keating as director of publicity.

Mr. Keating is a partner in the firm of Davee, Koehnlein & Keating, and Ken. M. Davee of that organization will also be associated with the Institute's research and publicity work.

Both men have been engaged for several years in the development of sales training programs for such companies as the General Electric Company, Standard Oil of Ohio, Iron Fireman Mfg. Company, Shell Petroleum Corporation and others.

During 1939 the regular news of the Porcelain Enamel Institute's activities will be augmented by a publicity program covering all porcelain enamel products and based to a considerable extent on two major types of research.

An extensive technical research program is being conducted by the Technical Research Section under the chairmanship of R. R. Danielson of Metal & Thermit Corp., Cartaret, N. J. Prof. R. M. King of Ohio State University is Technical Director. Dr. Paul L. Smith, Research Fellow at the National Bureau of Standards in Washington, is conducting a series of tests for the Institute.

A market analysis of the porcelain enamel sign field is now in progress and already information of substantial value to sign users has been revealed. A similar analysis of at least one other branch of the porcelain enamel industry is in prospect during the coming year.

Informative material for consumers based on these market studies and on the work done by the Technical Research Section will be released to the general public and in particular to all prospective users of porcelain enamel products. The program will be aimed to produce a stimulating effect on sales as well as a better understanding of what the Porcelain Enamel Institute and its members are accomplishing.

M. E. Baker Company to Occupy New Quarters

M. E. Baker Company, formerly located at 81 Haverhill St., Boston, Mass., will occupy its new quarters at 143 Sidney St., Cambridge, Mass., according to a recent announcement. M. E. Baker Company is a distributor for Hanson-Van Winkle-Munning Co., Lea Mfg. Co., Detroit Rex Products Co., Belke Manufacturing Co., American Cyanamid & Chemical Co., and others and also carries the largest stocks of rebuilt, guaranteed equipment in the East for electroplating, polishing, burnishing, tumbling and barrel plating.

The new building which will be occupied by M. E. Baker Company is of modern, fireproof construction comprising about 10,000 sq. ft. and complete with railroad siding. The building will house all stock as well as equipment repairing and testing division departments.

R-700

An unusual Rust Inhibitive.

Dries with lacquer speed.

Very flexible baking schedule.

Resists salt spray remarkably.

Very light in color.

Ideal vehicle for bronze powders and pastes.

Suggested wherever RUST is a production problem.

Remarkably adherent as primer under baked finishes.

Variations for special requirements available.

Our pamphlet will be gladly sent on request.

The Varnish Products Co.
5208 HARVARD AVENUE
CLEVELAND, OHIO

NEW *Plant equipment and* MATERIALS

Packer-Matic Polishing and Buffing Machine

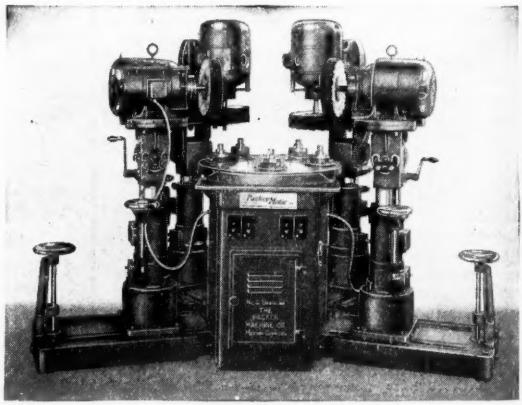
Packer Machine Company, Meriden, Conn., pioneer builders of automatic polishing and buffing machines, have placed on the market a rotary type, 5 work station machine which is said to have an entirely new and radically different design, to be known as "Packer-Matic No. 4."

One of the outstanding features of the Packer-Matic No. 4 is the smooth-looking main pedestal. In this pedestal is housed the motor drive variable speed unit, an oil reservoir for all moving parts beneath the work table and all the electrical push button controls which provide centralized operation. This new design is such that all moving working parts beneath the work table are completely enclosed and guarded against dirt and abrasive dust.

The moving parts beneath the work table that operate in a bath of oil are accessible by merely removing a tray at the operator position. A projecting tray in the front of the Packer-Matic serves as a convenient table for the operator while handling work.

The centralized operator control is said to be an important time and labor saver in the operation of the Packer-Matic No. 4. This type of control affords individual control for each motor, emergency control switch for all motors, all the controls being conveniently located within easy reach of the operator from his position in front of the pedestal.

The wheel capacity has been increased 25 per cent in the Packer-Matic No. 4. The wheel stands on the Packer-Matic are individual units and can quickly be



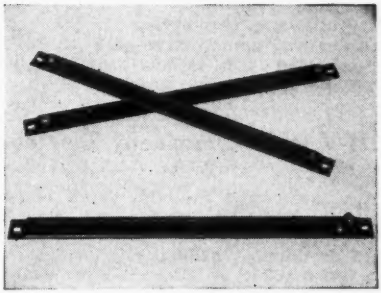
Packer-Matic No. 4 Polishing and Buffing Machine

attached or detached, depending upon the customer's requirements. The No. 4 unit can be furnished with from one to four wheel head stands with wheels mounted either to the motor spindle or with multi-V-belt driven ball bearing wheel spindles, which are said to permit changing of speeds for the wheels.

The speed of the work table can be operated at a ratio of 3 to 1 by the adjustment of a hand wheel control located near the operator position. The maximum diameter of the work to be polished or buffed has been increased from 8 in. to 12 in. on the new Packer-Matic No. 4. All bearings throughout the unit are of anti-friction type. A Packer composition applicator for automatically applying composition can be supplied for all Packer-Matic Automatic Polishing and Buffing Machines.

Westinghouse Strip Heaters

Two new types of strip heaters designed to produce fast, economical heat have been announced by the Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa. Made in two temperature ratings of 750 deg. F. and 1,200 deg. F. on the sheath, the heaters are particularly applicable on crane cabs, valve houses, elevators, ovens, metal



Westinghouse Strip Heaters

water tanks, pipe lines, hydrants, hot tables, metal molds, foundry platens—wherever ease of application and convenience are requirements.

The heaters may be obtained either with both terminals at one end or at opposite ends for installation convenience. Heating elements, with refractory insulation and sealed against moisture,

DID YOU KNOW THAT—

—The spraying of large quantities of small formed parts can be performed easily and economically with automatic equipment? See page 8.

—A simple draft gage can be made for measuring suction and air volume at exhaust hoods and in ducts? See page 21.

—If barrel finishing operations were properly understood, there would not be a single plant in the country where electroplating is practiced that would not also have its proper complement of barrel finishing equipment? See page 46.

—Spots and flecks on work are almost entirely eliminated when the conveying distance between the spray booths and drying ovens is reduced to a minimum? See page 50.

—Free information can be had on practically any subject dealing with the metal finishing industry? See page 70.

—You can get a larger share of business from the metal cleaning, plating, polishing and finishing industries through advertising in PRODUCTS FINISHING!

are completely enclosed and bolt holes are provided at each end for quick and permanent installation.

Available for operation on 115 volts, 230 volts and two styles for 250 volts, the heaters include sizes of 8, 12, 18, 24, 30½, 36 and 43 in. in length with ratings from 150 to 1,250 watts.

H-V W-M Chemically Treated Buffs

An interesting method which is said to make buffs last longer and stand up better against abrasive wear by the use of a chemical treatment has been placed on the market by Hanson-Van Winkle-Munning Company, Matawan, N. J. These buffs are available in two types of square count cloth known as "Economy" and "Tractor."

The buffing cloths, as they come from the loom, are passed through a chemical bath. The wear resistance developed by this chemical treatment is further increased by the carefully balanced construction of the buffing textile. It is stated by the manufacturer that the treated buffs absorb polishing composition better, and thus give improved cutting and coloring action to the workpiece being buffed.

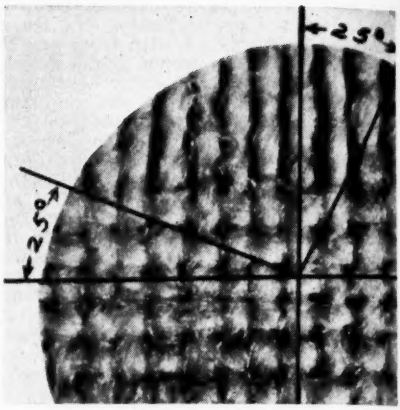


Illustration showing a "Tractor" buff which is chemically treated to stand abrasive wear. Note the twist in the horizontal threads to an angle of 25 deg. The magnification of the specimen is 25 times.

The chemicals used for treating the buffs include a hygroscopic element, the purpose of which is to absorb moisture from the air, fixing it in the cloth and giving it a conditioned sheeting at all times.

Tolhurst Centrifugal Enameler

A newly designed Tolhurst Centrifugal Enameler which is said to enable manufacturers of small articles such as cabinet hardware, electrical fittings and parts, springs, screw machine products, stampings, and so on to coat them easily and efficiently with enamel, lacquer, japan or other rust preventing materials, has been placed on the market by Tolhurst Centrifugal Division, American Machine and Metals, Inc., 100 Sixth Ave., New York, New York.

The Tolhurst Centrifugal Enameler is said to not only accomplish the coating operation in a minimum of time, but also enables a smooth and even coating to be applied. All excess coating material can be completely recovered for reuse. Hollow or cupped articles can be handled easily without filling or clogging. Perforations and screw threads can be coated uniformly and free of excess coating.

The Tolhurst Centrifugal Enameler

DIE CASTINGS UNETCHED BY 30 MIN. BATH

A LARGE COMPANY cleaning zinc-base castings for nickel plating had considerable etching. By switching to Metso Cleaner, articles are now suspended as long as 30 minutes without visible etching, even though cathode cleaning for this period. Die castings are now clean and unetched. For any cleaning prior to plating, get improved results with Metso.

PHILADELPHIA QUARTZ CO.
General Offices: Ionic & 3rd Sts., Philadelphia
Chicago Sales Office: 205 W. Wacker Drive
METSO CLEANERS

Tolhurst Centrifugal Enameler

consists essentially of a removable container which is called a basket and a curb. The parts to be finished are placed in the basket, or for special types of work on racks, and the basket is then placed on a spindle located within the curb. A sufficient amount of coating material is then allowed to flow in until the articles are completely covered. The machine is then closed and the basket set in motion.

As the basket rotates, the centrifugal pressure developed forces the coating material into every opening and over the entire surface of the parts. The thickness of the coating can be easily controlled by regulating the amount of centrifugal action. No special grade of lacquer, enamel or other coating material is required. The Tolhurst Centrifugal Enameler is made in four sizes ranging in capacity from 1 to 15 cu. ft. of work per load. According to the manufacturer, up to 20 loads per hour are possible.

Maas and Waldstein Zinsol

A compound to be known as "Zinsol" to be used with a method of treating the surfaces of zinc, zinc-coated and galvanized coatings before finishing them with lacquer, enamel, paint or varnish has been developed and placed on the market by Maas and Waldstein Company, 438 Riverside Ave., Newark, New Jersey.

Zinc or zinc-coated products are dipped in or wiped with a solution of Zinsol. The Zinsol compound causes the formation of an alloy, consisting primarily of zinc. This alloy is said to be chemically inert to moisture, atmosphere and organic finishes so that it forms a stable foundation for practically any kind of finish.

RUST-I-CIDE "50"

Cleans, etches, and prepares metal for a perfect finishing job.

It can help your product.

RUSTICIDE PRODUCTS CO.

3125 Perkins Ave. • Cleveland, Ohio

HARSHAW ANODES AND CHEMICALS PRODUCE BETTER DEPOSITS

THE HARSHAW CHEMICAL CO.

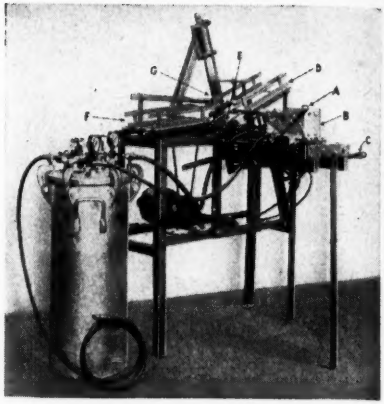
Manufacturers, Importers, Merchants

Cleveland, Ohio and principal cities

Eclipse Semi-Automatic Spray Machine

Eclipse Air Brush Co., Inc., 390 Park Ave., Newark, N. J., has developed and placed on the market a machine for the semi-automatic spray coating of the inside of small cylindrical objects such as metal cans. The cylindrical objects to be finished are fed by gravity down an adjustable slide and are released by a manually operated lever onto a rotating fixture.

A solenoid operated spray gun fitted with an extension nozzle is then moved forward to coat the inside, while at the same time the cylinder is being rotated. The gun is pulled back and the next cylinder comes down, pushing the finished one onto a loading rack. A one-sixth horsepower electric motor operates the automatic driving mechanism of the equipment. According to the manufacturer, an average production of 10,000 pieces per 8-hour day can easily be maintained with the Eclipse Spray Machine.



Eclipse Semi-Automatic Spray Machine

Don't Waste Labor and Good Paint on Poorly Prepared Surfaces

Remember That—

DEOXIDINE cleans metal surfaces perfectly for painting.

GRANODINE coatings bond paint and metal, and preserve both.

Write for details.

AMERICAN CHEMICAL PAINT CO.
Box 303, AMBLER, PENNA.

Seal Cote

A transparent, hard metal coating that is not subject to climatic conditions, which is to be marketed under the trade name of "Seal Cote," has been placed on the market by Bonwit-International Company, 545 Fifth Ave., New York, N. Y. This type of finish is said to preserve the original finish and brilliance of polished copper, brass and bronze as well as other metals.

Seal Cote metal coating is easy to apply with spray gun or brush, one coat being recommended for indoor and two coats for outdoor work.

Acme Type WA Automatic Water-Heated Electric Glue Kettle

An automatic water-heated electric glue kettle to be known as the "Type WA" has been placed on the market

For a real good polishing job use

KEYSTONE EMERY

TURKISH — NAXOS — AMERICAN

KEYSTONE EMERY MILLS *Write for Sample* **4316 Paul St., Phila., Pa.**

Acme Type WA Automatic Water-Heated Electric Glue Kettle

by Acme Electric Heating Company, 1217 Washington St., Boston, Mass. This type of kettle is made of heavy gage copper and is equipped with an electric-heated immersion heating element which delivers a maximum of uniform heat.

An accurately calibrated thermostat maintains the fixed temperature of the glue at all times. A thermometer with the bulb projecting into the water chamber indicates the water temperature.

Agitation can be obtained either by hand or mechanical means and can be specified, since either method is supplied as standard equipment.

A non-cooling quick-acting draw-off valve is so located that it makes the drawing of glue a simple matter. A water drain valve is also supplied on the bottom in such a position that the heated water may be utilized for building up additional glue. The water filling-in spout is equipped with a filter so that all the water that enters the tank is kept clean from foreign matter.

A sturdy steel stand with flared legs to prevent tilting is provided as standard equipment. The operating mechanism, including a switch mechanism, relay and cutouts, are mounted on the steel stand.

The rated capacities of the Acme Type WA Automatic Water-Heated Electric Glue Kettle are 10, 15, 25 and 50 gallons.

Chromized Rustex

A rustproofing material that is said to produce a transparent film on metal and thus stop corrosion, to be known as "Chromized Rustex," has been placed on the market by Claronex Products, Inc., 235 India St., Brooklyn, N. Y. This material is available in liquid form for

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An etched grain built to withstand the shock and stress of rough work Sizes 10-90 incl.

2. EPT LIONITE
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NIAGARA FALLS, N. Y.

K 235
THE STAINLESS STEEL BUFFING COMPOSITION
BUCKINGHAM PRODUCTS COMPANY
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CUT COSTS
WRITE FOR SAMPLES

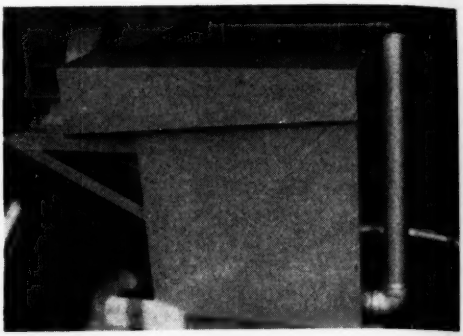
application to metal surfaces by brushing or spraying. The material deposits a stable film of chromium on the surface and is said to neutralize existing rust during the time of application and dries to a transparent non-porous film.

Application of Chromized Rustex can be made on surfaces that will be subject to temperatures between zero and 600 deg. F. The dry film of Chromized Rustex is said to be tough, elastic and to resist the action of dilute acids and alkalies. The dielectric strength is 1,100 volts per mil of thickness.

Application of Chromized Rustex can be made in connection with a color finishing or aluminum outer coat employing Claronex finishing materials. The coverage of Chromized Rustex is approximately 1,600 sq. ft. per gallon on rusted surfaces. The material is available in 1, 5, 30 and 55 gallon containers.

Heil Gas Heated Chromium Plating Tank

A chromium plating tank with a self-contained heating element has been designed and built by Heil and Company, 3088 West 106th St., Cleveland, Ohio.



Heil Gas Heated Chromium Plating Tank

This tank is lead lined, and is available complete with an exhaust arrangement and gas heater ready for operation.

The design of the Heil Gas Heated Chromium Plating Tank incorporates the gas heating efficiency obtainable with an immersed gas flue system but without exposing the heating flues to the corroding effect of chromic acid. The entire unit is compact and requires a minimum of space in the shop.

Clements "Cadillac" All Purpose Blower

A blower designed to combine the utility of two blowers in one versatile portable tool has been brought out by Clements Manufacturing Company, 6655 S. Narragansett Ave., Chicago, Ill. The tool is not only designed for use as a

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"INDIAN BRAND" TURKISH AND NAXOS EMERY

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. . . cuts cleaner, faster and longer because it's made only from select grades of ore — accurately graded and thoroughly cleaned. *Prompt shipments on any quantity.*

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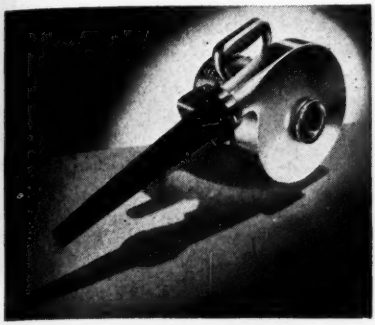
Use Metalprep to clean and prepare all sheet metal surfaces before painting. Removes rust and grease.
Write for Literature
NEILSON CHEMICAL CO.
6564 BENSON ST. DETROIT, MICH.

blower; it is also intended for use as a suction cleaner and sprayer.

The mechanism is housed in a sturdy, sand cast aluminum housing and the fan is also single cast aluminum, statically and dynamically balanced. A three-



Clements "Cadillac" All Purpose Blower

cord heavy duty cable is supplied for positive grounding. The feature of the blower is the combination of high and low speeds; the air blast velocity can immediately be cut from 26,000 to 20,500 lineal feet per minute when a lighter blast is required, and is quickly increased again when necessary.

The blower can be used as a suction cleaner when necessary, operating on the low speed and using with the proper attachment. The power on low speed is said to be ample for all suction cleaning but not so strong as to suck dangerous fragments of iron or steel into the fan chamber. The blower can also be converted into a sprayer for spraying paints, lacquers, deoddrants, and other liquids of varying densities.

Operating at high speed, the blower has capacity of 176½ cu. ft. per minute and at low speed the capacity is 125 cu. ft. per minute. Power is supplied through a universal ball bearing motor. Voltages, 100 to 275.

U. S. Conveyor Belt

A conveyor belt embodying a feature designed to withstand unusually severe service conditions has been placed on the market by United States Rubber Co., Mechanical Goods Division, 1790 Broadway, New York, N. Y. The new feature of the U. S. Conveyor Belt is said to be obtained by imbedding a special weaver breaker-strip fabric in a heavy layer of soft white gum. This layer is inserted next to the belt carcass as an integral part of the belt conveyor and is said to provide a shock-absorbing cushion for the belt cover.

The new type of construction increases the effectiveness of the cover in resisting gouging, snagging and other severe wear encountered in heavy-duty service. In addition to the increased cover wear thus obtained, the manufacturer states that extra protection is provided for the belt carcass due to the insertion of the white breaker insert which will withstand and cushion the blows of heavy material.

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Here is a *completely automatic* process for finishing all metals to a high grade lustre *at a saving of from* 60% *to* 92%.

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Degreasing
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"D'OILERS"
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PLEASING IN APPEARANCE
WITH UP TO THE MINUTE
FEATURES BUILT INTO THEM

Mechanical Process Corp.
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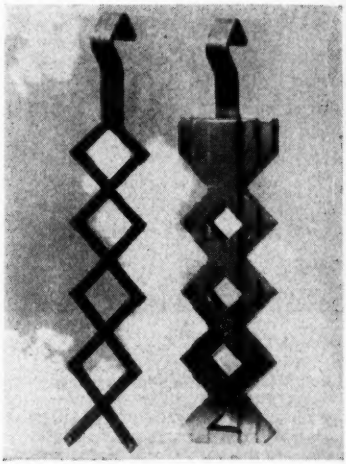
Specialists in the use and handling of chlorinated solvents . . .

Securus Lattice Lead Anode for Chromium Plating

Securus Lead Products Company, 6410 Detroit Ave., Cleveland, Ohio, has recently placed on the market a new type lead anode to be known as "Securus" for chrominum plating and other electrolytic processes. The Securus type anode is said to provide unusually low electrical resistance, a maximum of even current distribution and unusual mechanical rigidity against bending and warping.

The construction embodies a lattice type frame of strip copper, upon which is deposited and firmly bonded by a special process, a thin film of pure lead which serves as an integrally-homogeneous base on which lead is built up to the desired thickness. Inasmuch as all the parts of the lead are supported by the highly electrical conductive copper frame by lead burning or other suitable means, low resistance and unusual rigidity are obtained at all points.

A final treatment with a lead burning flame is said to consolidate the lead coating to a maximum density and assures freedom from porosity and blow holes which might otherwise permit penetration of the solution to the copper itself.



Securus Lattice Lead Anode for Chromium Plating

The Securus Lattice Type Anode is available both in special sizes and to standard dimensions according to individual requirements.

Lee Suspended Type Unit Heater

Dravo Corporation, 302 Penn Ave., Pittsburgh, Pa., has introduced a high capacity, suspended type unit heater designed for use in large industrial buildings where high velocity heated air is desired to heat rooms of large floor area

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Oriental Rouge Co., Inc.

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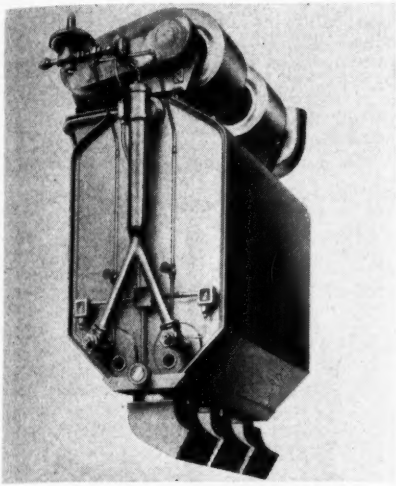
and high ceilings. Identified as the Lee Suspended Type Unit Heater, this gas-fired unit operates on natural gas, manufactured gas, or coke oven gas. It is 3 ft. wide, 5 ft. long and 7 ft. high, weighs



Lee Suspended Type Unit Heater

3,000 lbs., and is of welded steel construction throughout. It has an output capacity of 500,000 B.T.U. per hour. The air discharge is 5,500 C.F.M. with an average temperature rise of 110 deg. F. and correspondingly high outlet temperatures. The air velocity at heater outlets is 2,000 F.P.M. Two blower type fans are used to spread the air. The suspended type unit is of particular value in conserving floor space.

Ferro Ultra-Opaque Porcelain Enamels

A new and revolutionary development in the way of greatly increased opacity for porcelain enamel finishes is available to the trade, according to an announcement made recently by Ferro Enamel Corporation, 4150 E. 56th St., Cleveland, Ohio. The new enamels will be furnished to fabricators under the designation of Ultrapaque No. 1313.

Besides a saving of 40 per cent in cover coat requirements, compared with previous needs, the outstanding features are greatly increased resistance to mechanical shock and deflections, greater resistance to scratching, practical elimination of chipping, and the production of enameled sheets that shear neatly with no chipping back from the edges.

Ultrapaque No. 1313 enamel frit is supplied to the enameler in a powdered form and preground so that 90 per cent of it passes through a 200-mesh sieve. In the enameling plant, it is necessary only to add water to it in the mill and

MAGIC TACK RAGS remove specks, lint and sand particles--- bring out that deep, smooth luster, produce a faultless surface for white or colored finish. Why use "home made" tack rags when you can buy MAGIC TACK RAGS at trifling cost! They are tackier, do not dry--- are dust-proof and spontaneous combustion proof. Packed in dozen and gross lots or more. Made only by the

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then grind to a dry residue of about one gram per 100-gram sample of milled enamel on a 325-mesh sieve.

Because of its fine particle size, Ultrapaque is said to spray easily, stay in suspension and cause less wear on spray equipment. This finish fires at slightly lower temperatures than standard cover coats, but otherwise can be handled in the usual manner.

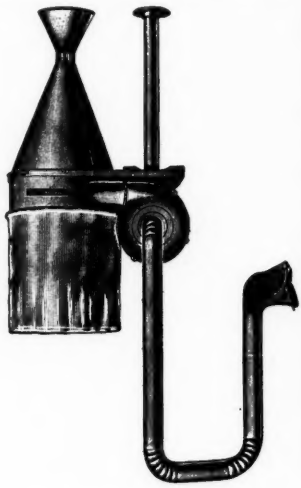
Leiman Dust Collector for Surface Grinders

A dust collector for continuous surface grinding operations which is said to be 95 per cent efficient has been placed on the market by Leiman Bros., Inc., 3W-23 Walker St., New York City. The efficiency of the Leiman unit is due to the dust collecting system employed in embracing a very powerful motor-driven suction fan which draws the dust from the surface grinder through a suction hood and telescope-jointed piping and transfers it directly to a metallic cyclone of ample proportions.

The cyclone system whirls the dust with high centrifugal force and concentrates the main body of the dust mass into the cone, depositing it by means of a powerful vortex into the dust receptacle at the bottom, the air escaping through a bag which covers the top of the cyclone.

The bag restrains very fine residue of dust, allowing only filtered air to escape. The dust hood can easily be attached to the present wheel guard by any mechanic. The suction pipe is provided with a telescoping feature to permit raising and lowering of the grinding wheel.

The Leiman Dust Collector for surface grinding occupies 18 x 33 inches of floor space. The standard units for alternating current operate at 110 volts.



Leiman Dust Collector for Surface Grinders

CP Two-Speed Universal Electric Sander

The feature of the CP Two-Speed Electric Sander, product of Chicago Pneumatic Tool Company, 6 E. 44th St., New York, N. Y., is the ability to change from one sanding speed to another by simply pressing a button. Instead of the usual separate gear shift lever, a plainly marked button for each speed is located in the switch handle. Two corresponding sets of gears are always in mesh with the driving pinion and, when

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the selected button is pressed, the speed is changed electrically without loss of power and efficiency.

The sander is available in two types, standard duty and heavy duty. The heavy duty sander is identical in design with the standard sander, except that it is higher powered for continuous production service under the most severe conditions.

Furnished as standard equipment with either sander are 9-in. abrasive discs for general metal sanding. A disc cutter is also furnished for cutting down the worn 9-in. discs to 7 inches.

The standard duty sander in the 7 and 9-in. sizes runs at a free speed of 4,000 and 2,500 r.p.m. at a loaded speed of 2,400 and 1,500 r.p.m. Length overall is 18¾ in. and net weight is 14½ lbs. The heavy duty sander operates in the 7 and 9-in. sizes respectively at a free speed of 4,300 and 2,700 r.p.m. and at a loaded speed of 2,600 and 1,600 r.p.m. Overall length is 19½ in. and net weight is 17 lbs. Standard equipment includes 15 ft. of three-conductor cable and plug, one 7-in. rubber sanding pad, one 9-in. rubber sanding pad, three 9-in. diameter sanding discs and one disc trimmer. The sander can be furnished for either 32 volts or 250 volts on special order.

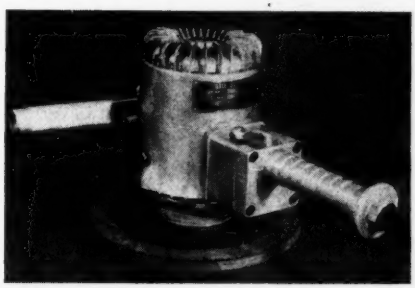
CP Two-Speed Universal Electric Sander

Maizo Drying Material

The Lea Manufacturing Co., Waterbury, Conn., has been appointed New England distributors for "Maizo," a drying material which is manufactured by The Maizo Mills, Circleville, Ohio. Maizo is a platers' drying material which is said to have a high absorbing quality and is free from dust. The material is suitable for burnishing and all drying operations. Carload stock is carried by The Lea Manufacturing Co. at their Waterbury warehouse.

Gaston Portable Disc Grinder

The illustration shows a portable grinder and sander manufactured by Gaston Power Tools, Evergreen Park, Ill. This new powerful sander has no gears and only two bearings. The motor is of the induction type with no commutator and no brushes. The winding is enclosed in a dust-tight case.



Gaston Portable Disc Sander

Two sizes are available: 1 h.p. for the heaviest kinds of grinding and sanding; ½ h.p. for light duty. Each size is capable of 100 per cent overload momentarily. The sanders are made for the regular 220 volt, 3 phase, 60 cycle power circuits.

Check in ✓ DeWITT OPERATED HOTELS

In CLEVELAND it's
✓ The HOLLENDEN

In COLUMBUS it's
✓ The NEIL HOUSE

In AKRON it's
✓ The MAYFLOWER

In JAMESTOWN, N. Y., it's
✓ The Jamestown and
✓ The SAMUELS

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for your CATALOG library

To obtain copies of the catalogs listed here, indicate on the coupon the number of the item in which you are interested and mail as directed.

1. Miller Buffing Compositions
An excellent folder describing and illustrating buffing compositions for every kind of metal finishing manufactured by J. C. Miller Company, 528 Lake Michigan Drive, N. W., Grand Rapids, Mich.

2. Satin-Black Friction Reducing Finish
A 4-page folder describing Pentrate, a penetrating process which provides a means of applying an attractive, low-cost, friction reducing, black finish to steel through chemical action. Heat-bath Corporation, Springfield, Mass. See page 49.

3. New Wrinkles
A 12-page catalog published by New Wrinkle, Inc., Mutual Home Bldg., Dayton, Ohio, describing in detail the various types of wrinkle finishes available for product finishing. See page 29.

4. Metal Polishing
The many applications of the polishing materials marketed under the name of Lionite are described and illustrated in this 12-page catalog. General Abrasive Co., Inc., 3508 Hyde Park Blvd., Niagara Falls, N. Y. See page 63.

5. Dust Collecting Systems
An attractive 24-page catalog has just been issued by The Kirk & Blum Mfg. Co., 2816 Spring Grove Ave., Cincinnati, Ohio, which illustrates and describes many K. & B. Dust Collecting Applications installed in numerous industries. See page 25.

6. Micro Supreme Stop-Off Lacquers
A 4-page folder describing stop-off lacquers for insulating plating racks used in decorative plating and for masking parts to be hard chromium plated now being issued by Michigan Chrome Company, 6342 E. Jefferson Ave., Detroit, Mich. See page 15.

7. Tolhurst Centrifugal Coating Machine
The method for applying finishing coatings fast and economically with no drip or thick spots, and no ridges of excess coating is described in this 4-page bulletin now being issued by Tolhurst Centrifugal Division, American Machine and Metals, Inc., 100 Sixth Ave., New York, New York.

8. Ideal Speed Lathes
A 16-page catalog describing Ideal Speed Lathes designed especially for finishing and polishing is now being issued by Schauer Machine Co., 2060 Reading Rd., Cincinnati, Ohio.

9. Airway Ventilated Buffs
Cool cutting buffs for high speed buffing operations are illustrated and described in a 4-page folder now being distributed by Jackson Buff Corporation, 21-03 41st Ave., Long Island City, New York. See pages 36 and 27.

10. Speedip Whirl Enameler
A 4-page bulletin describing a combination dipping-whirling machine for completely coating large quantities of parts with lacquer, enamel, paint or any other liquid finishing material. Ronci Machine Co., 45 River Ave., Providence, R. I.

11. Metal Preparation Before Finishing
A folder describing the practical use of Rusticide "50" in preparing metal surfaces before paint. Rusticide Products Co., 3125 Perkins Ave., Cleveland, Ohio.

12. Nickelite
A 4-page folder describing Nickelite, an addition agent for nickel barrel plating solutions. Platers Research Company, 74 Grand Ave., Brooklyn, N. Y. See page 25.

13. Rust-Proofing Methods
New books describing the Parker Processes are available to manufacturers and technical men. For more than 22 years the Parker Rust-Proof Company, 2172 E. Milwaukee Ave., Detroit, Mich., has devoted its entire time to rust-proofing methods. See page 31.

14. Alkali Cleaning Compounds
A new bulletin has been released by Detroit Rex Products Co., 13017 Hillview Ave., Detroit, Mich., describing Triad Alkali Cleaning Compounds. See fourth cover.

15. Protective and Decorative Finishes
Hilo Varnish Corporation, 42-60 Stewart Ave., Brooklyn, N. Y., presents Bulletin No. 15 titled, "The Five Hilo Rip-pls."

16. Metal Cleaning Hints
An interesting bulletin giving details on Metalprep Rust and Grease Remover. Tells how Metalprep makes metals safe for paint. Neilson Chemical Co., 6564 Benson St., Detroit, Mich. See page 64.

17. Burnishing Barrels
Complete details on the Abbott burnishing barrels and burnishing materials are contained in a folder brought out by Abbott Ball Company, 1061 New Britain Ave., Hartford, Conn.

18. Industrial Ovens
Two new bulletins giving full particulars on air heaters and industrial ovens. J. O. Ross Engineering Corporation, 350 Madison Ave., New York, N. Y. See third cover.

19. Spray Booths and Ovens
Newcomb - David Company, Inc., 5741 Russell St., Detroit, Mich., has issued a 24-page catalog illustrating and describing typical N-D Spray Booths, Industrial Ovens, Metal Booths, Washers and Ventilating Equipment.

20. Analysis of Plating Solutions
A 24-page booklet containing methods of analyzing plating solutions in practical operations has been issued by Hanson-Van Winkle - Munning Co., Matawan, New Jersey.

21. Belke Insulated Racks
One of the most authoritative and instructive plating rack bulletins ever published by Belke Mfg. Co., 945 N. Cicero Ave., Chicago, Illinois.

Print plainly in filling out coupon for literature.

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